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# HANDBOOK

OF THE

# HOSPITAL CORPS

UNITED STATES NAVY

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PUBLISHED BY
THE BUREAU OF MEDICINE AND SURGERY
UNDER THE AUTHORITY OF
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# THE MEDICAL DEPARTMENT OF THE UNITED STATES NAVY

# HANDBOOK OF THE HOSPITAL CORPS

Prepared under the direction of

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## **FOREWORD**

Wherever there are units of the U.S. Navy and U.S. Marine Corps on duty, well trained and efficient corpsmen of the Medical Department will also be present. Although often performing routine and monotonous duties they are ever ready in peace or war to render unselfish and devoted service to their companions in uniform. Their record from the beginning of the Hospital Corps is one in which they take a justified and deep satisfaction in their technical competence. Their devotion to the demands of the military service, their undaunted courage in the face of danger, and their high morale reflect the fine quality of the personnel of their corps.

To assist in keeping the high technical level already attained, this revision of the Handbook of the Hospital Corps is being promulgated. This revision constitutes a practically rewritten version and contains as much up-to-date, new and modern information as was possible to obtain at the time of revision.

The Handbook is officially approved as a textbook for the instruction of hospital corpsmen of the U.S. Navy as well as personnel from other Federal agencies desiring to use it. It is designed to serve as a guide and reference book for "All Hands" but particularly for the corpsman on duty independent of a medical officer.

As Surgeon General, I desire to express my appreciation and thanks to the many officers, enlisted personnel, and civilian personnel who have collaborated so ably and selflessly in the preparation of this revision. I realize that many of them have contributed many hours outside their normal duties.

It is hoped and believed that this new Handbook of the Hospital Corps will be a worthy successor and addition to all those that have preceded it.

B. W. Hogan,

B. W. Hogan

Rear Admiral, MC, Surgeon General, U.S. Navy



## **PREFACE**

The mission of the Hospital Corps is to give efficient assistance to the Medical, Dental, Medical Service, Nurse and Hospital Corps officers not only in the eternal war against disease, injury, and death, but also in the supportive branches dealing with supply and administration. And, in the absence of officers, to meet emergencies, both medical and supportive, with knowledge and independent judgment. It is toward this end that the hospital corpsman is trained—trained to meet his responsibilities and, what may be equally important, to recognize his limitations especially in the field of medicine.

There has long been a textbook for training hospital corpsmen. The first, a *Handy Book for the Hospital Corps, United States Navy*, was published in 1914. Since then, periodically, new texts have appeared as new developments demanded revision. This, the eighth, has been revised to meet the

same demands.

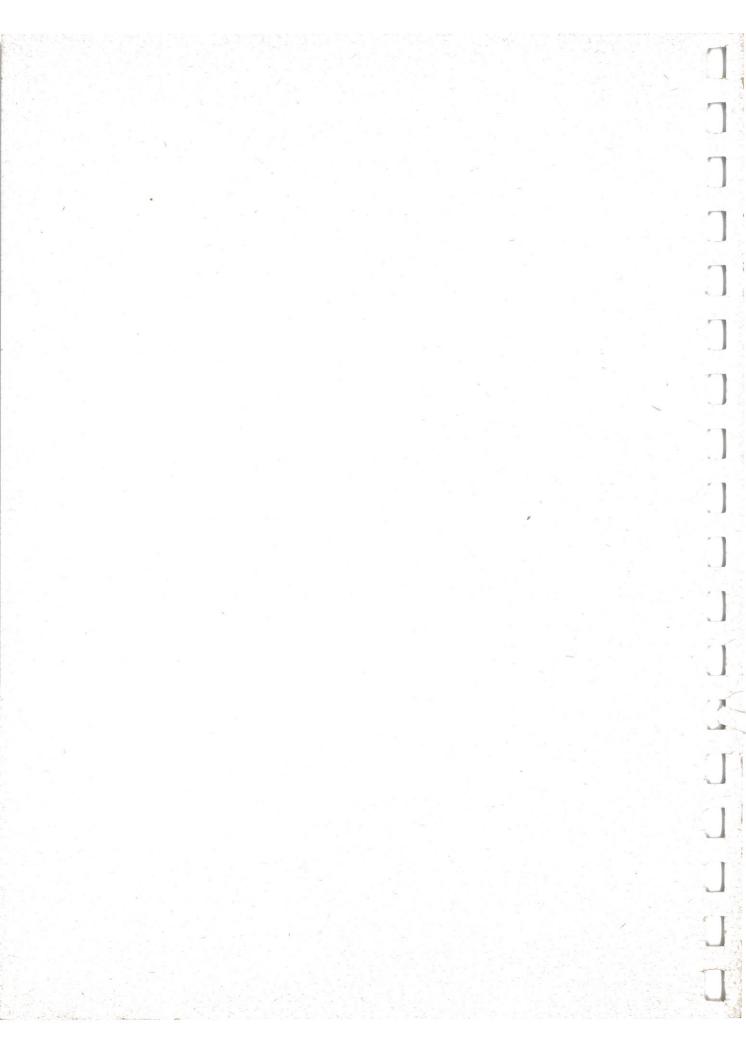
In an effort to prevent this printing of the Handbook from becoming obsolete even as it is published, a new format has been adopted. This, the loose-leaf, has the decided advantage over the bound volume in that inserts can be prepared and distributed to the field as new concepts and methods of management become available through research and experimentation. It is hoped that with this change, the hospital corpsman will always have at hand a reference, text, and guide which will reflect the latest developments in medical care and current policies of the Bureau of Medicine and Surgery, Department of the Navy.

Nursing and Nursing Procedures, the first chapter to be ready for printing under this new plan, has been extensively revised to incorporate suggestions from the field, new procedures in patient care, and standard forms in current use. Other chapters have been revised and will be published shortly; still others are in the hands of cognizant divisions where work on revision is progressing. Eventually, a never-to-become-outmoded text should be in all Hospital Corps schools, sick bays, and other Medical Department facilities.

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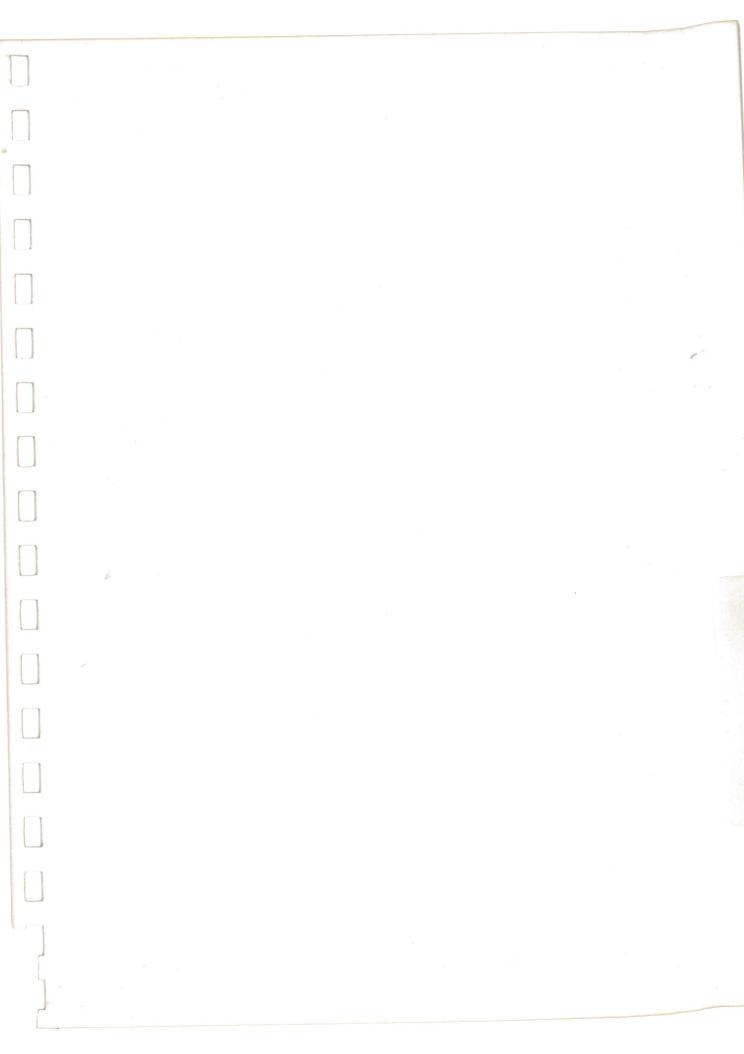
L.B. Marshall Captain, MC, USN (Retired) Director of Publications Division Bureau of Medicine and Surgery

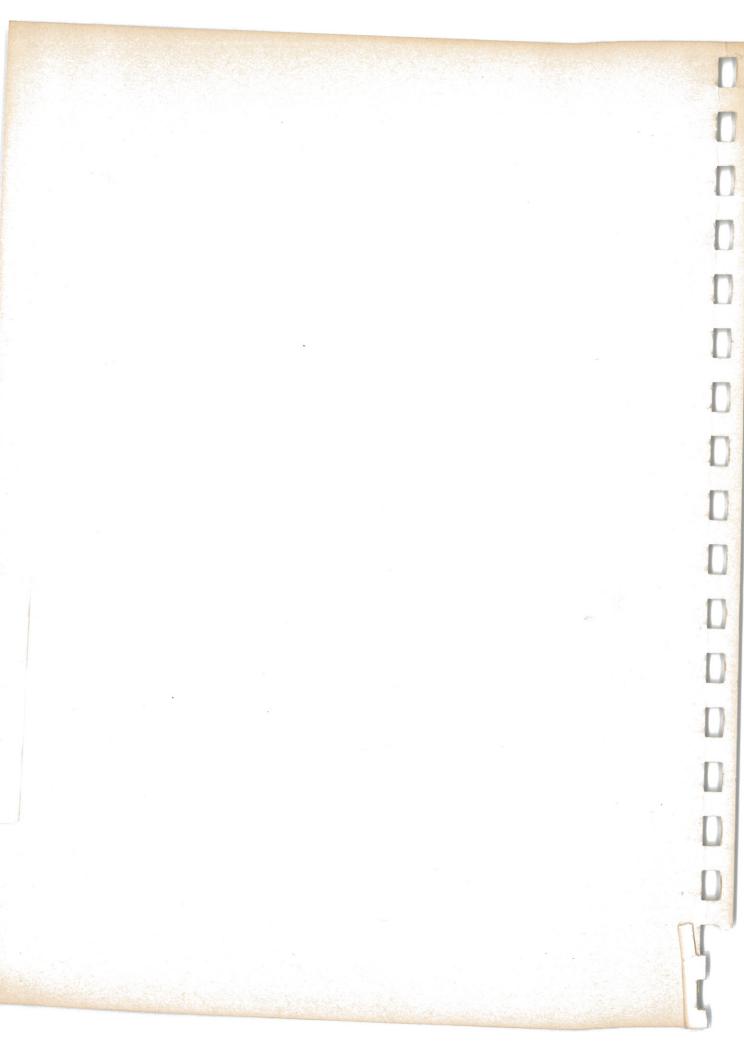
Washington, D.C., 1 June 1959











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## Chapter IV

# NURSING AND NURSING PROCEDURES 1\*

#### INTRODUCTION AND ORIENTATION-UNIT I

The scope of the material presented in the nursing section is limited to those activities which the corpsman will most likely encounter in a sick bay or hospital ward. It is further limited to the "how" and "what" to do and the reader is referred to other sections of the handbook for the "whys." In this manner it is hoped that the corpsman will more readily see the relationship of the sciences to the care of his patients and the relationships of sections to one another and thus obtain the maximum benefit and use from this handbook.

#### **OBJECTIVES:**

This section of the handbook was compiled with these objectives in mind:

- 1. To provide the corpsman with a guide to use in the care of his patient.
- 2. To provide a basis for the standardization of routine nursing procedures in our Naval hospitals.
- 3. To provide a basis for the standardization of ward administration or management procedures.

In attempting to attain these objectives, we have presented the text in the form of procedures wherever possible.

The elements of care required for all patients are included in detail, while the care of patients with specific conditions is omitted or very limited. The ward management procedures included may be generally applied to all wards.

Nursing as defined in this handbook is the care given to sick and injured people. Nursing procedures are methods used in giving nursing care to these patients.

#### **PURPOSES:**

The purposes of nursing and nursing procedures are as follows:

1. To maintain, promote, and restore the patient's health.

- tlent's health.

  1 Much of the material in this chapter was compiled from the lecture notes and lesson plans of former and present Nurse Corps members of the faculties of the Hospital Corps Schools and from procedure manuals of several Naval
- \*Prepared by Lt. Cdr. Elizabeth Feeney, NC, USN (representing Capt. Ruth A. Houghton, NC, USN), Nursing Division, Bureau of Medicine and Surgery.

- 2. To protect the patient against contracting a new infection, a reinfection, or a new condition.
- 3. To assist in the cure of the patient's disease or condition.

To achieve these purposes it is necessary that the corpsman:

- 1. Attend to the comfort of the patient.
- 2. Prevent the spread of infection.
- 3. Assist with or perform diagnostic and therapeutic procedures as ordered by the doctor.
- 4. Plan and adapt the nursing care to meet the needs of his patient.

#### The Comfort of the Patient

This means attention to the physical and mental comfort of the patient. By attention is meant the accurate observation of the patient's needs and then doing something about them.

"Make the patient comfortable" is not ordered by the doctor; it is up to the corpsman. This is the art of nursing. Making the patient physically comfortable includes providing facilities for a clean patient in clean surroundings; frequent change of position employing comfort devices when needed; attention to patient's diet and elimination. Making the patient mentally comfortable includes keeping the ward quiet and cheerful; providing for the patient's rest and relaxation; treating the patient as a person; promoting his confidence in ward personnel; and keeping him contented. Physical and mental comfort depend on each other; both must be considered and remembered when planning a patient's care.

#### Prevent the Spread of Infection

The patient comes to the hospital or sick bay expecting to be relieved of his complaints. Everything done for the patient must be directed toward relieving his complaints without exposing him to a new condition or disease. All people are possible carriers and all people are possible victims of disease caused by living organisms. Remember that! You are people! That is the reason why you are urged to get enough sleep and rest, why

you are told to keep your body and clothes clean, and why washing your hands will be stressed throughout this section.

The comfort of the patient and the prevention of the spread of infection are measures required by and for all patients and therefore are considered as basic nursing care.

# Assist With or Perform Diagnostic and Therapeutic Procedures

All diagnostic and therapeutic procedures are prescribed by the doctor for each individual patient. In following techniques of a procedure as outlined in this section, try to remember your patient is a person and adapt the procedure to his needs. The diagnostic tests and examinations are presented in outline form only. Reference

should be made to local station instructions for specific details.

#### Adaptations of Nursing Care

The discussion in this section is limited to the additional measures required on the general services. The procedure manual of the local station or nursing textbooks should be consulted for information relating to the care of a patient with a specific condition.

#### CORPSMAN—NURSE—DOCTOR RELATION-SHIP

This is a team. The officer-enlisted personnel relationship exists because the patient requires care. Therefore the primary function of the team

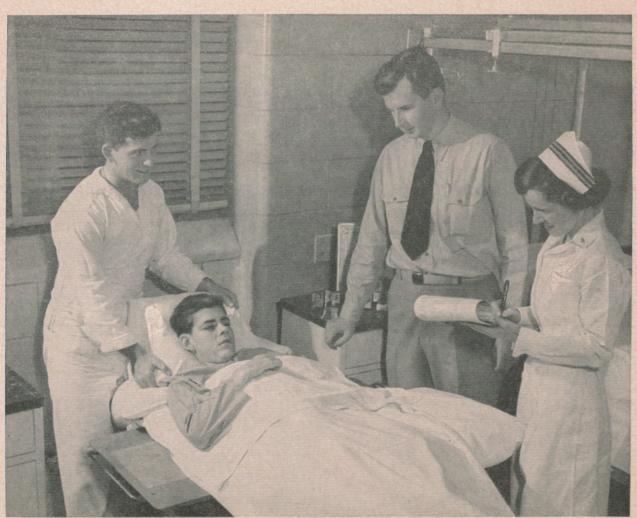


Figure 1.—The Doctor—Nurse—Corpsman Team.

is the care of the patient within the limit set by higher authority.

The doctor gives the orders and expects them to be carried out. He is responsible to the chief of his service for the care and treatment of his patients, the efficient operation of the ward, and the coordination of ward activities with other departments of the hospital.

The nurse determines how the doctor's orders are to be executed. She is responsible to the doctor and senior nurse for the nursing care of her patients, the management of the ward, and the supervision and instruction of the corpsman.

The corpsman carries out the orders of the doctor in the manner designated by the nurse. He is responsible to the doctor and the nurse for the efficient care of his patients and for carrying out his assigned duties.

As on any team, there must be mutual respect, cooperation, coordination, and loyalty among its members. Each must appreciate and understand the other's role in the function of the team. When each member of the team knows where he fits on the team, what he is to do on the team, to whom he is responsible on the team, and how he is to do his part on the team, all members take personal responsibility for the team's product which is provision of the best possible care to, and for the patient.

#### CORPSMAN-PATIENT RELATIONSHIP

The corpsman is in close contact with the patient throughout his stay in the hospital or sick bay. The patient frequently first makes known his wants, worries, fears, and pains to the corpsman. The tact, kindness, consideration, and understanding the corpsman shows toward the patient and his problems will help build the patient's confidence in the ability of all sick bay and hospital personnel to return him to health and duty in the shortest possible time.

The attitude of the corpsman toward his patients should be: Friendly, sympathetic, kind, considerate, tactful, courteous, assuring, fair and honest to all. Always interested, calm, dignified, softspoken and self-controlled.

The following are suggested as items the corpsman should think about, know and practice in relation to his patient or patients each day.

1. Be an example of good health. Be clean,

look clean, feel clean. Use good posture and body mechanics in performing activities for your patient, for you may teach your patient good health habits while he is ill which, if practiced, will help him keep well after he leaves your care.

2. Get to know your patient: How does he feel about his illness? His treatment? Other patients? Ward personnel? Try to find out and understand what makes him behave the way he does.

- 3. Be alert and observant. Learn to recognize signs and symptoms, be alert to changes in the mental and physical condition of your patient. Use your eyes, ears, nose, and hands. Read and understand the doctor's orders; if in doubt, consult the doctor or nurse.
- 4. Be adaptable. Learn to adjust nursing care to fit the individual needs of the patient.
- 5. Be skillful. Learn the routines of procedures so that they may be done with the least discomfort to your patient.
- 6. Know the "why" of what you are doing. Make frequent reference to other parts of this handbook to better understand the reasons underlying the "how."
- 7. Have a plan. Use your head to save your Think out what you want to do, how much time you have to do it in, and the method or sequence of doing it. Examine your plan: Is it safe for your patient? Will it be comfortable or add to the comfort of your patient? Is it the best way to save time, materials, and produce the desired effects or results? Will your plan make it possible for you to do the best job you are capable of doing?
- 8. Explain your plans to your patient. him what you are going to do for him and how he may help to get the best results from the procedure.
- 9. Protect your patient and yourself by preventing the spread of infection.
  - 10. Teach your patient the importance of:

Personal cleanliness, particularly washing his

Covering his mouth and nose when he coughs or sneezes.

Using only his own toilet articles.

Getting the proper rest.

Eating the proper diet.

Analyze your work each 11. Grow in your job. day-strive to do a better job each day.

References and Suggested Reading-Unit I

Manual of the Medical Department (NAVMED P-117), Washington, Government Printing Office, Reprint 1958.

Medical Department Orientation (NAVPERS 10816-A). Washington, Government Printing Office, 1955.

Medical Department Orientation, Correspondence Course (NAVPERS 10943-A). Prepared by Bureau of Medicine and Surgery. Washington, Government Printing Office, 1957. Render, H.: Nurse-Patient Relationships in Psychiatry. New York, McGraw-Hill Publishing Co., 1947.

Rapier, D. K., Koch, M. J., Moran, L. P., Fleming, V. L., Cody, E. L., and Jensen, D. (Ed): *Practical Nursing*. St. Louis, C. V. Mosby Co., 1958. Chapter 3, pp. 23–29.

Dakin, F., Thompson, E. and LeBaron, M.: Simplified Nursing. 6th ed. Philadelphia, J. B. Lippincott Co., 1957. Chapter 3, pp. 23–31.

Armed Forces Medical Journal. Check issues for pertinent articles.

### BASIC NURSING CARE—UNIT II

Basic nursing care as considered in this handbook consists of those environmental, hygienic, and supportive measures required by the patient for the promotion of his health and his protection against contracting any additional infection, disease, or condition.

Patients in our hospitals are usually segregated according to clinical services. This segregation serves to protect the patient from exposure to new diseases; to provide a more specialized program of therapy for the patient; and to facilitate nursing care.

#### Environmental Measures

The following practices, common in the care of all patients, serve to protect the patient and prevent the spread of infection—

- 1. Beds are spaced at 8-foot center intervals.
- 2. All furniture is damp-dusted, floors are wet-mopped.
- 3. Each patient is provided with a complete bedside unit; bed, bedside locker, and chair. His belongings are kept within this unit.
- 4. Each bed patient is provided with individual equipment such as wash basin, curved basin, toothcup, bedpan, and urinal.
- 5. Only clean articles and utensils are brought to the patient and are disinfected or sterilized after he uses them before being returned to general use.
- 6. All dishes are sterilized or sanitized after each meal.
- 7. All body discharges and excreta are considered as disease carriers and are treated as such.
- 8. Sterile supplies and equipment are used for treatments such as irrigations, instillations, surgical dressings and injections.
- 9. Emphasis is placed on washing hands after the care of each patient and after each task using plenty of soap (to emulsify the dirt), friction (to loosen the dirt), and running water (to get rid of the dirt).

These practices form the basis for medical and surgical aseptic techniques which are additional measures used in caring for a patient with a communicable disease or a patient with a wound.

#### Medical Aseptic Technique

The purpose of medical aseptic technique is to confine the disease to the patient and to protect the worker and other patients from the infection. The technique consists of isolating the patient in a separate ward, room or unit; the concurrent disinfection of materials and utensils coming from the patient; and sometimes the use of protective clothing by the worker while caring for the patient. This technique is often termed isolation or precaution technique. Specific techniques in the care of a patient with a communicable disease are discussed in Unit IV.

#### Surgical Aseptic Technique

The purpose of surgical aseptic technique is to protect the patient from infection that is possibly carried in the air, by the worker, by worker's equipment, or by other patients. This technique consists of segregating the patient in a separate ward, room or unit; sterilization of all articles going to the patient's wound or used in treatments requiring sterile equipment; and sometimes the wearing of sterilized clothing by the worker (as in the operating room).

Surgical aseptic technique includes the preparation, sterilization and handling of sterile supplies and equipment. When used in this sense, it is often termed *sterile technique*.

Surgical aseptic technique and the handling of sterile supplies and equipment are discussed in greater detail in Units IV and VI.

#### Hygienic and Supportive Measures

The amount of assistance the patient will need in performing hygienic and supportive measures as described in this unit will vary according to his general physical condition and the limitations set by his disease. Some patients will need complete care by the nursing personnel, some will need assistance with their own care, while others will require only supervision and direction by nursing personnel.

The sequence in this unit has been planned from the point of view of establishing a suitable environment for the patient, his admission, observations to be made, and the hygienic and comfort measures that may be required during his stay in the ward.

#### THE PATIENT'S ENVIRONMENT

Review——Chapter VI, Environmental Control sections

The ward is a unit of a hospital composed of a number of beds and other equipment necessary to provide service to and for the patients assigned to it. The ward may accommodate from 6 to 60 patients at one time and should provide a pleasant cheerful environment for the patients and personnel. The ward should be orderly—a place for everything and everything in its place.

#### Appearance of the Ward

Beds should be in a straight line, away from walls with casters turned in, made up as for standard beds (see Bed Making) and spaced at 8-foot center intervals.

Bedside lockers should be on the right side of beds even with head of beds and clear of all unnecessary articles.

Bedside chairs should be in a straight line near foot of beds on same side as lockers.

Overbed tables should be at the foot of the bed. Window shades should be at uniform height and sills cleared of all articles.

Floors should be clear, shoes and slippers inside bedside lockers.

Waste baskets should be kept empty; other furniture arranged in orderly fashion.

#### Hygiene of the Ward

Ventilation.—Provide for free circulation of air; protect patients from drafts by use of ventilators or screens.

Temperature.—Maintain constant and proper temperatures during day, 68° (72°-75° during bath time), 65° at night.

Lighting.—Avoid glaring lights in patient's eyes; promptly replace burned-out bulbs.

Odors.—Keep at minimum by prompt disposal of excreta, dressings, trash. Use deodorants if necessary.

Noise.—Avoid dropping and banging equipment and loud talking and laughing; wear rubber heels on shoes.

#### The Patient's Unit on the Ward

The patient's unit should be a clean, comfortable place for the patient to live. While he is under your care he will spend the greater part of his time in his unit. He will need a comfortable bed, a bedside locker for his personal gear, and a chair for himself or his visitors.

#### CLEANING A BEDSIDE UNIT

#### PURPOSE:

To insure a clean, sanitary bed for the patient. INDICATED:

Once a week for all units; upon patient's discharge; whenever presence of vermin is suspected. EQUIPMENT:

Basin of warm soapy water Sand soap or powder Cleaning cloths Whisk broom Newspaper Hamper for soiled linen

#### Stripping the Bed

- 1. Bring linen hamper to unit.
- 2. Push bedside locker to back of bed; place chair at foot of bed.
- 3. Remove pillows, strip, and place on chair; place linen in hamper.
- 4. Lift mattress with one hand; pull out linen with other hand. Loosen bedding all around bed.
- 5. Remove spread, sheets, mattress cover <sup>2</sup> separately, and place in hamper.
- 6. Remove blanket <sup>3</sup> and rubber sheet and place over back of chair.
  - 7. Take linen hamper out of unit.

<sup>&</sup>lt;sup>2</sup> Plastic mattress covers: Do not remove from mattress for routine cleaning or upon discharge of patient. Do inspect for holes and tears. Wash in same manner as rubber sheet.

<sup>&</sup>lt;sup>3</sup> Cotton blankets: Send to laundry with other linen. Woolen blanket: If soiled, send to laundry. Requires special laundering and should be so marked. Check station instructions for any specific procedures in the care of woolen blankets.

8. Remove all articles from the bedside locker. Articles to be boiled may be sterilized while the unit is being cleaned.

#### Cleaning Unit

- 1. Place cleaning equipment on top of locker.
- 2. Spread newspaper on floor under bed. (If floor is terrazzo or concrete, newspaper may be omitted).
- 3. Swing mattress crosswise to lower half of bed.
- 4. With damp brush or damp cloth, brush top and nearest side of mattress. Pay particular attention to tufts and crevices.



Figure 2.—Cleaning a Bedside Unit.

- 5. Raise the headrest of the Gatch bed. With damp cloth wash springs, coils, bed frame; follow with dry cloth.
- 6. Lower headrest. Turn mattress clean side down onto the upper half of the bed. Brush mattress
- 7. Place rubber sheet on springs, wash with damp cloth and dry. Turn onto mattress clean side down and wash other side.
- 8. Place pillows on springs, brush with damp brush, and turn onto mattress clean side down; do other side. Place blanket over head of bed.
- 9. Wash lower springs, coils, bed frame as before. With damp cloth wash chair; dry well.
- 10. Place cleaning equipment on newspaper on floor.
  - 11. Wash locker inside and outside; dry well.
- 12. Use sand soap if necessary for enamel surfaces.

- 13. Take equipment to utility room. Scour cleaning basin, place in sterilizer, boil 20 minutes; wash out cleaning cloths, and hang up to dry.
- 14. Mop floor. If in room; mop, wax, and buff floor.
  - 15. Remake bed; straighten unit.
- 16. Whenever possible allow unit to air 6 to 24 hours before remaking bed.

#### BED AND BUNK MAKING

Bed in hospital.—The hospital bed is higher than the bed in the barracks. The purpose is to bring it up to a better working level and thus reduce fatigue and avoid backstrain for the personnel caring for the patient.

The bed with a Gatch frame is the fundamental device for making the patient comfortable. The crank-operated Gatch frame permits raising and lowering of the head and foot; the newer frames may be adjusted to many different positions and have attachments to support fluid containers, orthopedic apparatus, and sidebars. The legs of the bed have rubber tired wheels to make them movable and are equipped with brakes to make them stationary. The mattress in most Naval hospitals is of the inner spring type and should be firm, even, and clean. The bedding under the patient should be smooth and tight. The upper bedding should be loose, of light weight, draped evenly, and of sufficient warmth and length to keep the patient comfortably warm.

Bunk aboard ship.—The bunk aboard ship is narrower than the hospital bed and may not have a Gatch frame. The head or foot of the bunk may be raised by inserting a board under the mattress.

#### Bed and Bunk Making (Unoccupied)

#### PURPOSES:

To provide a clean, warm, sanitary bed or bunk to receive a patient.

To provide a neat, uniform appearance to a ward or sick bay.

#### **EQUIPMENT:**

- 1 mattress cover
- 2 sheets
- 1 blanket
- 1 spread
- 1 pillow with cover and case

#### BED MAKING

#### (A) Mattress cover

Fold cover back on itself. Place top corner of mattress into cover, far corner first, flap of cover on top of mattress.



Pull cover down on mattress - working each side alternately.



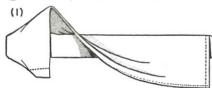
Fold under excess at foot. Smooth out cover, tighten at sides.

#### (B) Bottom sheet

Place center fold of sheet in center of bed, narrow hem even with foot, smooth side up. Fold excess sheet under mattress at head of bed.



(C) Mitered corner—Pick up hanging sheet I2 inches from head of bed.



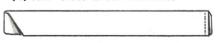
(2) Tuck lower corner under mattress.



(3) Hold fold with left hand. Bring triangle down over side of bed.

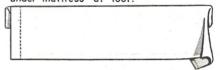


(4) Tuck sheet under mattress.



#### (D) Top sheet

Center fold in center of bed, wide hem even with top of mattress at head of bed, smooth side down. Tuck excess under mattress at foot.



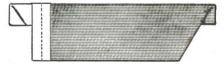
(E) Blanket—Center, in center of bed 6 inches from top of mattress. Fold excess under mattress at foot of bed.



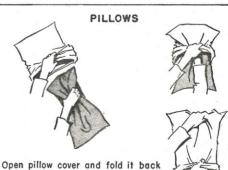
Make mitered corner at foot of bed. Tuck in triangle — do not tuck in sides



(F) Spread — Center fold in center of bed even with top of mattress. Tuck excess under mattress at foot. Miter corner, allow triangle to hang. Fold cuff of top sheet over spread at head of bed.



Repeat on other side of bed.
Pull sheet taut before tucking under mattress.



Open pillow cover and fold if back on itself. Gather pillow lengthwise, fit corners of pillow into corners of pillow cover. Grasp pillow through pillow cover, pull cover down over remainder of pillow. Repeat for pillow case.

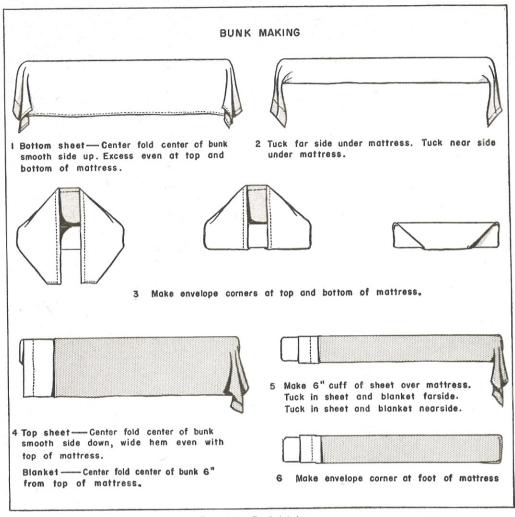


Figure 4.—Bunk Making.

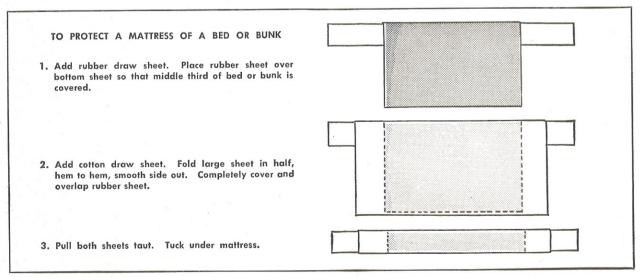


Figure 5.—To Protect Mattress of Bed or Bunk.

When additional protection of the mattress is desired, add:

- 1 rubber draw sheet
- 1 cotton draw sheet

#### PROCEDURE:

Follow steps in illustrations (figs. 3, 4, and 5). When a blanket is not needed, the top sheet and bedspread may be mitered together at the foot of the bed.

#### Recovery Bed (Postoperative or Ether Bed)

#### PURPOSE:

To provide a warm, comfortable bed for the postoperative patient.

To protect the mattress.

#### **EQUIPMENT:**

In addition to the equipment listed under Unoccupied Bed—

Small rubber sheet

Cotton sheet

Paper bag and safety pin

Three hot water bottles 4

#### For the bedside locker:

Curved basin

Box tissues

Clock with a second hand

Pencil and paper

Sphygmomanometer

Stethoscope

Padded tongue depressor

Bandage

#### PROCEDURE:

- 1. Make the bottom or foundation bed as directed in Bed Making.
- 2. Place the small rubber sheet over the bottom sheet at the head of the bed. Fold the cotton sheet in quarters; cover the rubber sheet. Tuck in both sheets at sides.
- 3. Open top sheet on bed, smooth side down, center fold down center of bed, hem even with top of mattress.
- 4. Open blanket on bed, center fold down center of bed, 6 inches from the top of the mattress.

- 5. Open spread on bed, center fold down center of bed, smooth side up, hem even with top of mattress.
- 6. Fold spread over blanket, sheet over spread at the head of the bed.

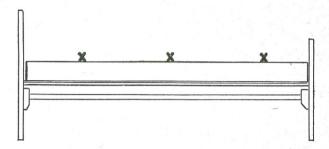


Figure 6.—Hot Water Bottle Placement.

- 7. Fold sheet over the spread and blanket at foot of bed.
- 8. Tuck in top bedding along the side away from the entrance.
- 9. Fold top bedding up onto bed on the side nearest the entrance.
- 10. Fit pillow into cover and case; place between rungs at the head of the bed.
- 11. Pin paper bag to side of mattress at the head of bed.
- 12. Arrange equipment on bedside locker as illustrated.
  - 13. Push locker to back of bed.

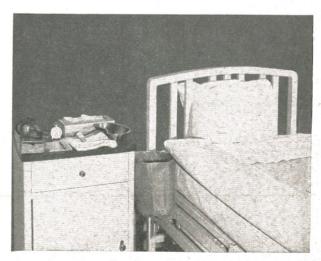


Figure 7.—The Recovery Bed.

<sup>4</sup> The practice of placing hot water bottles in a recovery bed is gradually falling into disuse. It is recommended that hot water bottles be included only when the bed is prepared for a patient in poor physical condition; for a patient subjected to extremes in temperature in traveling to and from the operating room; and when ordered by doctor or nursing supervisor. If hot water bottles are used, place them in the bed under the top cover as illustrated (fig. 6). Be sure to remove hot water bottles before putting patient to bed.

#### Bed Making (Occupied)

#### PURPOSE:

To provide clean bedding with least exertion to patient.

#### EQUIPMENT:

Linen as needed.

Hamper for soiled linen.

#### PROCEDURE:

- 1. Place chair at foot of bed; push bedside locker back of bed.
  - 2. Loosen all bedding at sides and foot of bed.
  - 3. Remove pillow, strip case, and place on chair.
- 4. Remove spread in quarters, fold from top to bottom, pick up in center, and place on back of chair
  - 5. Remove blanket in same manner.
  - 6. Turn patient to one side of bed.



Figure 8.—Changing the Bottom Sheet.

### To change bottom sheet, draw sheet:

- 1. Roll draw sheet close to patient's back.
- 2. Fold rubber sheet up over patient.
- 3. Roll bottom sheet close to patient's back.
- 4. Place clean sheet on bed, center fold in center of bed, smooth side up, narrow hem even with foot of mattress.
- 5. Tuck in excess at head of bed, miter corner, and tuck in at side.
  - 6. Bring down rubber sheet; straighten.
- 7. Fold large sheet in half, hem to hem, smooth side out.

- 8. Place on bed, fold toward head of bed, overlapping rubber sheet.
  - 9. Tuck in rubber and draw sheets together.
- 10. Roll patient over to completed side of bed toward you.
  - 11. Remove wrinkles from under patient.
- 12. Go to other side, fold in soiled sheets, remove, and place in linen hamper.
- 13. Turn back draw and rubber sheets over patient.
- 14. Pull bottom sheet tight and smooth; proceed as for first side.
- 15. Pull rubber and draw sheets tight; tuck under mattress. Do center portion first, then upper and lower ends.
  - 16. Bring patient to center of bed.

#### Top bedding:

- 1. Place top sheet over patient, smooth side down, wide hem even with top of mattress; turn down to make 10 inch cuff.
  - 2. Ask patient to hold clean sheet.
- 3. Reach under, grasp soiled sheet, remove, and place in linen hamper.
- 4. Place blanket 6 inches from top of mattress. Make pleat in sheet and blanket over patient's toes, tuck in excess at foot, and miter corner.

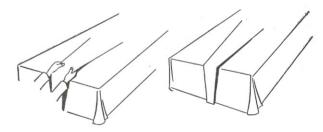


Figure 9.—Toe Pleat.

- 5. Place spread smooth side up even with head of bed; fold spread over blanket at head of bed; fold sheet over spread.
- 6. Tuck in excess at foot, miter corner, and allow triangle to hang loosely. Top sheet and spread may be mitered together when blanket is not needed.
- 7. Fit pillow into corners of case; place under patient's head, seam toward back, closed end toward entrance to ward.
  - 8. Adjust Gatch bed as ordered.
- 9. Straighten unit; leave bedside stand within reach of patient.

#### Modifications:

- 1. Top sheet may be used as draw sheet. Change top sheet first; then fold for draw sheet. Proceed as above.
- 2. Spread may be too short. Make foot of bed; then fold excess, if any, over blanket.
- 3. For patients with long-term illnesses, remove, wash, and replace rubber draw sheet weekly or more often as necessary.

## Bunk Making Aboard Ship (Occupied)

The bunk aboard ship is made in the same manner, with the following exceptions:

- 1. The patient is turned toward the corpsman.
- 2. The side of bunk nearest the bulkhead is completed first, the patient is then turned toward the bulkhead and the other side of the bunk is completed.
- 3. The top bedding is made with envelope corners at the foot of the bunk.

# ADMISSION, TRANSFER, AND DISCHARGE OF PATIENT

Review——Local Station Instructions

BUMED INSTRUCTION 6010.3A

Whenever a patient is admitted, discharged or transferred, a record of the action must be made in order to keep the status of patients and the census of the ward current.

In naval hospitals and in some station hospitals, these changes in census are recorded on the Ward Data Record (NAVMED 1359) of the Visible File Book. Illustrated guidelines for the use of the Visible File Book with its component records—Ward Data Record (NAVMED 1359), Nursing Care Plan (NAVMED 1350) for each patient and the Night Report (NAVMED 1367)—are contained in enclosure (1) of BUMED INSTRUCTION 6010.3A.

At station hospitals and ships where the inpatient census is low and irregular, the changes in census are recorded in the Ward Report Book. See Unit V of this chapter for instructions on the format and content of the Ward Report Book.

#### **ADMISSION**

Ambulatory Patient In admission unit:

Greet patient courteously; seat him at desk.

Type out Admission Record (NAVMED 1285); follow instructions on record.

Seal patient's gear in presence of the patient; send gear to bag room.

Assist doctor with physical examination.

Notify ward of patient's admission.

Send patient to ward with—

Completed copy of Admission Record (NAV-MED 1285)

History Sheets I and II (Standard Forms, SF 504, 505).

Physical Examination (Standard Form, SF 506)

#### In ward:

Greet patient courteously, introduce yourself, and seat him at desk.

Take patient's temperature, pulse, and respiration (TPR); blood pressure (BP); height and weight. (If patient's temperature is 100° or over, put him to bed immediately.)

Find out his chief complaints, other objective and subjective symptoms.

Have patient read the hospital regulations and the ward routine.

Assign patient his bed; provide towels and pajamas; introduce him to his neighbors. Instruct patient and supervise his tub bath or shower.

Notify doctor of admission.

Start patient's chart:

Fill out chart headings.

Graph temperature, pulse and respiration on Form 511.

Start nursing notes—date, time, manner of admission, his chief complaints, and objective symptoms.

Enter patient's name and other necessary information in—

TPR book.

Ward Report (NAVMED 9).

Ward Diet List.

Diet Sheet (NAVMED 18).

Ward Report Book or Ward Data Record (NAVMED 1359) and Nursing Care Plan (NAVMED 1350).

Place Admission Record in alphabetical order in ward roster.

Make out bed tag; place in holder at foot of bed.

#### Stretcher Patient

#### In admission unit:

If patient is able to give information and is not seriously ill, follow instructions as outlined under Ambulatory Patient.

If patient is seriously ill or unable to give information-

Provide necessary emergency measures prescribed by the doctor and send patient to ward as soon as possible.

Obtain information for Admission Record (NAVMED 1285) from person accompanying the patient.

Seal and send patient's gear to bag room. Send receipt for clothes with valuables to the disbursing officer or officer of the day.

#### In ward:

Put patient to bed immediately.

Notify ward doctor and carry out emergency measures needed.

Take patient's temperature, pulse, respiration, and blood pressure.

Start chart.

If patient's condition permits and does not interfere with treatment, give bed bath. rashes, scars, sores, reddened areas, or lice.

# Patient in Wheel Chair or Child in Arms

In admission unit:

Carry out procedure as for Ambulatory Patient.

#### In ward:

Put patient to bed.

Follow procedure as for Ambulatory Patient; include bed bath.

#### TRANSFER OF PATIENT

Admitted From Other Ward (AOW)

Receiving ward:

Have bed ready for patient.

Receive patient and his records.

Assign patient to his bed; introduce him to his neighbors.

Have patient read ward routines affecting him.

Notify doctor of new admission.

Record AOW in Ward Report Book or Ward Data Record (NAVMED 1359); Ward Report (NAVMED 9); patient's chart.

Enter patient's name in TPR book, Ward Diet

List. Diet Sheet (NAVMED 18).

Place Admission Record (NAVMED 1285) in Ward Roster; place bed tag on bed.

Insert Nursing Care Plan (NAVMED 1350) in Visible File Book.

Notify diet kitchen.

#### Transferred to Other Ward (TOW)

#### Transferring ward:

Make out TOW slips. Send copies to:

Receiving ward with patient.

Personnel office.

Chief of service.

Officer of the day.

Post office.

Notify receiving ward. Do not transfer patients at mealtimes, visiting hours, or during sick call.

Send patient to receiving ward with his gear, chart, Admission Record (NAVMED 1285), and if being used, Nursing Care Plan (NAVMED 1350).

Enter TOW in Ward Report (NAVMED 9), and in Ward Report Book or Ward Data Record (NAVMED 1359).

Remove name from TPR book, Ward Diet List and Diet Sheet (NAVMED 18).

Notify diet kitchen.

#### Transferred to Another Hospital

Carry out procedure as for Discharge to Duty.

#### DISCHARGE OF PATIENT

#### Discharge to Duty (D)

#### Before discharge:

See local station instructions.

Discharge may be ordered by the doctor 24 to 48 hours before actual discharge. At the time the order is written-

Close out patient's chart, arrange pages in numerical order, attach discharge slip to top page.

Send complete chart to record office.

#### Day of discharge:

Have patient strip his bed and clean and make up his unit if he is able.

The reverse side of the ward copy of the Admission Record (NAVMED 1285) is printed so that it may be used as a check-out slip. Check those places from which the patient must have clearance. Tell the patient to obtain the initials of persons in these places and to leave the completed check-out slip at the record office for inclusion in his chart.

#### Ward records:

List patient's name as "D" in Ward Report (NAVMED 9) and in Ward Report Book or Ward Data Record (NAVMED 1359).

Remove patient's name from all other ward records.

Discard Nursing Care Plan (NAVMED 1350) if one has been used.

#### Discharge by Death (DD)

See Care of the Dead, Unit IV.

Arrange patient's chart in numerical order; attach Admission Record (NAVMED 1285) to chart. Send complete chart to record office.

Follow routine for ward records as above, using "DD."

Clean bedside unit.

#### CARE OF CLOTHING

#### PURPOSE:

To safeguard patient's gear; to safeguard personnel handling patient's gear; to simplify procedure for care of patient's clothes.

#### **EQUIPMENT:**

Metal seals (Stock No. 42–5–2135–200) Patient's Effects Storage Tag (DD 599) Pencil or pen

#### PROCEDURE:

#### In admission unit:

Seal patient's gear with metal seal in presence of patient. Permit only essentials to go to the ward. Essentials are toilet articles, stationery, uniform (1), and underwear. All other gear must be sent to bag room. Bags containing articles for bedside use must be small enough to fit inside bedside lockers.

Enter number of seal on top and stub portions of Effects Tag. Attach top to baggage. Give patient stub. Send gear to bag room.

If patient wishes and provides a lock, make a note to that effect on reverse side of Effects Tag.

#### In bag room:

Make out a Baggage Record Card (NAVMED HF-25) for patient's gear.

Store gear in bin or rack. Post number of bin or rack on Baggage Record Card. File record card in alphabetical order.

#### During Hospital Stay

#### In ward:

Toilet articles and small bag may be kept in bedside locker.

Uniform may be placed in the ward clothes locker, which must be kept locked except when one of the ward personnel is present. All items in this locker must be properly tagged.

A schedule of hours when locker is open for deposit and withdrawal by patients should be posted on ward bulletin board.

#### In bag room:

Hours for deposit and withdrawal are scheduled by the bag room. Check local instructions before sending patient to this room.

Ambulatory patient will break seal and deposit or withdraw the desired items in the presence of the bag room attendant. The bag room attendant will make a note of the deposit or withdrawal on the Baggage Record Card. Patient will sign note.

The bag room attendant will draw a line through the broken seal numbers on the record card, top and stub of Patient's Effects Tag; attach new seals to the gear, and enter new seal numbers on the record card and Patient's Effects Tag; give the patient a copy of the new seal number(s).

Bed patient will list items he wishes withdrawn or deposited in the bag room. The ward medical or nurse officer will sign a memorandum designating a corpsman to handle the transaction.

The bag room attendant will follow the same procedure as set out under Ambulatory Patient in resealing the gear. The memorandum will be attached to the Baggage Record Card.

#### On Discharge

Patient will report to bag room on day of discharge with check-out slip. Bag room attendant will sign check-out slip and will staple Patient's Effects Tag to Baggage Record Card. Bag room attendant will forward cards to record office for inclusion in patient's chart.

#### CARE OF VALUABLES

All patients must be informed of the wisdom of depositing their valuables with the disbursing officer for safekeeping. Patient must be made to understand that no responsibility is assumed by the hospital if he retains his valuables at his bedside. A signed statement by the patient should be included in his chart if he insists. Temporary storage of valuables in the narcotic locker of the ward medicine locker is prohibited.

Valuables are deposited for safekeeping with the disbursing officer during the day and with the officer of the day during the evening and night.

Ambulatory patient will be sent to the disbursing

officer or officer of the day. Patient and officer will inventory valuables. The officer will give the patient a signed receipt.

Bed patient will inventory his valuables with the ward medical or nurse officer. The officer will give the patient a temporary receipt and take the valuables to the disbursing officer. The patient will be given the disbursing officer's receipt and the temporary one will be torn up and discarded.

Incompetent patient is unable to participate in the inventory of valuables. The ward medical and nurse officers will inventory and deposit his valuables with the disbursing officer. The receipt will be placed in the patient's jacket in the record office.

#### OBSERVATION OF THE PATIENT

Review——Chapter II, "The Blood and Cardiovascular System"

"The Respiratory System"

Chapter III, First Aid and Emergency Procedures

Chapter VII, Basic Pharmacology

Observation of the patient is the recognition, recording and reporting of signs and symptoms indicating the mental and physical condition of the patient.

Signs and Symptoms.—Indications of the mental and physical condition of the patient may be classified as objective and subjective symptoms.

Objective symptoms are those which the observer can see, such as rashes, swelling, inflammation; can feel, such as skin eruptions, masses, changes in pulse; can hear, such as speech, snorting respiration; can smell, such as odors.

Subjective symptoms are those which only the patient can feel or describe, such as pain, tenderness, ache, and nausea.

Additional signs indicating the condition of the patient may be determined by the use of instruments, examinations and tests, such as thermometers, manometers, X-rays, and specimens.

The physical examination performed by the doctor at the time of the patient's admission is the basis on which the patient's plan of therapy will be prescribed. While assisting the doctor, note the systematic way in which he performs his examination, how he notices the patient's reactions and attitudes through friendly but pertinent conversation, how he obtains information relative to patient's past medical history and present illness. Through listening and observing during this initial physical examination, the corpsman will be better able to plan the nursing care to fit the needs of his patient.

#### ASSISTING WITH A PHYSICAL EXAMINATION

#### PURPOSE:

To aid the doctor in making a diagnosis and planning therapy.

To aid the corpsman in planning the necessary nursing care.

#### **EQUIPMENT:**

Tray with—

Diagnostic set (ophthalmoscope, otoscope)

Tongue depressors

Flashlight

Stethoscope

Sphygmomanometer

Tape measure

Rubber gloves or finger cot Skin pencil Percussion hammer Paper bag for used depressors Curved basin for specula Safety pins Paper towel

#### PROCEDURE:

- 1. Place patient in a warm, well-lighted room or screened area.
- 2. Tell the patient what is to be done and how he may help. (If a female patient is being examined another female must be present.)
  - 3. Undress and cover the patient with a sheet.
- 4. Take and record height and weight. (Place paper towel on scale.)
  - 5. Place patient in horizontal position.
  - 6. Have all equipment at hand.
- 7. Assist the doctor as necessary, placing patient in proper position for the examination desired (fig. 10). Doctor will usually examine patient's head first then proceed to chest, abdomen, extremities and genitalia. As the examination progresses, expose each part of the body.

#### After examination:

- 1. Make patient comfortable in bed.
- 2. Strip, clean, reset tray.

After his initial physical examination, the doctor depends upon the corpsman for the accurate recognition, recording and reporting of the patient's condition during the day and night. The corpsman is with the patient most of the time, the doctor only a few moments each day. In these few moments the doctor must use the corpsman's record and report in deciding whether the patient is doing well under present treatment or whether it should be changed or modified. It is important to be able to recognize even the slightest change in the patient because while the change is slight in itself, when combined with other changes it may show a definite disease process which may indicate further treatment.

The recording of observations should be done as soon as possible after they have been made. Do not wait until the end of the day because by that time you may forget a detail which is important in the treatment of your patient. Use medical terminology in your recording but if you are in doubt as to the correct term, use plain English.

The reporting of observations should be made immediately when prompt treatment is required. When reporting, give complete information: Patient's name; ward; present diagnosis; TPR; BP; symptoms; complaints; location, duration and severity of pain if present; and the general condition of your patient.

Observation is essential at all times, from the patient's admission until his discharge, particularly during bath and meal times, while asleep, during treatments, and during visiting hours.

Learning to recognize signs and symptoms of the patient (those he tells you, those you see, feel, hear and smell, and those you may infer by his actions and attitudes) takes time and experience. Learn to observe your patient using these questions:

What am I seeing, feeling, hearing, smelling? What can I do about it?

How is it affecting my patient?

Who should receive the report of these observations?

When should I report?

Where should I record?

The following suggestions on what to look for when you are observing your patient should assist you in developing your powers of observation. They are not all-inclusive, but merely guides.

#### Check-List For Observations

#### The Patient

#### General appearance:

Is he short? Stout? Thin? Average build? Does he appear in pain? Ill? Well? Does he walk normally? With a limp?

#### Behavior:

Does he appear happy? Worried? Excited? Depressed? Restless? Unconscious?

Does he refuse to talk or eat? Does he shout or sing?

When he talks, do his thoughts appear connected or does he ramble? Does he lisp, stutter, stammer?

Does he appear sullen? Aggressive? Friendly? Cooperative? Bored? Homesick?

Does he sleep well? Poorly? Is he restless in his sleep? Does he moan, groan, or cry out in his sleep?



SIMS—Used for rectal, vaginal and perineal examinations and treatments



DORSAL RECUMBENT—Used for examination of external genitalia; urethral, vaginal and rectal treatments



DORSAL LITHOTOMY — Used for examination of external genitalia; urethral, vaginal and rectal treatments



SHOCK or TRENDELENBERG—Used in treatment of shock; pelvic and abdominal surgery. Blocks also used for orthopedic patients in traction



LUMBAR PUNCTURE—Used for lumbar puncture. Important—Hips and shoulders must be in the same vertical plane



MODIFIED JACK KNIFE—Used for rectal examination and treatment. Legs may hang down straight



POSTURAL DRAINAGE - GATCH BED — Used to promote drainage from respiratory tract. Patient is placed over knee break of bed



POSTURAL DRAINAGE- STOOL METHOD — Used to promote drainage from respiratory tract

Figure 10.—Positions for Examinations and Treatments.

How does he act toward the other patients? Ward personnel? His visitors?

Does he join in ward activities?

#### Position:

Does he stay in one position in the bed? On his side or his back? Does he draw his legs up on his abdomen?

Does he have difficulty breathing when he lies down?

Is his neck stiff? Arched backward?

Is he able to move about in bed?

Is he comfortable?

Have you changed his position in the past 2 hours?

#### Skin:

Is it clean? Hot? Cold? Dry? Moist? Is the skin flushed? Pale? Cyanotic?

Are there any scars? Wounds? Rashes? Scratches? Bruises? Lumps?

Are there any signs of pressure? Redness? Mottling? Breakdown?

Does the skin appear shiny? Stretched? Is there edema present?

Is a pit made when the fingers are pressed into the skin?

Are there lice? Nits?

Does he perspire profusely?

When is the last time you gave him special skin care?

#### Eyes:

Are the eyelids swollen, bruised or discolored? Are the whites of the eyes clear? Dull? Yellow? Bloodshot?

Are the pupils contracted? Dilated? Equal in size?

Does he complain of pain? Burning? Too much light?

Is there a discharge from his eyes? Tears?

#### Ears:

Do the ears appear normal?

Does he seem to hear well?

Does he complain of buzzing or ringing in his ears?

Does he have any discharge from his ears? What kind is it?

Does it have an odor?

#### Mouth:

Does his tongue appear dry? Moist? Clean? Coated? Cracked? Red? Spotted?

Does he complain of an unpleasant taste? Is there an odor to his breath?

What kind of an odor?

Are his teeth in good repair? Clean? Does he have removable bridges? Dentures?

Does he have any sores in his mouth? What do they look like?

Does he complain of any soreness?

When was the last time you gave him special mouth care?

#### Nose:

Does his nose appear straight?

Does he appear to have difficulty breathing through his nose?

Is there any nasal discharge present?

#### Chest:

Are there rattling, snorting or wheezing sounds when he breathes?

Does he have pain or difficulty breathing?

Is he coughing? Is the cough productive? Dry? Hacking? Persistent?

Is sputum expectorated? Is it white? Yellow or rusty? Thick or thin? Large or small amount? Does it have an odor? What kind of odor?

#### Abdomen, bowels, and bladder:

Is the abdomen distended? Is the distention above or below the umbilicus or over the entire abdomen?

Does he belch?

Is he nauseated?

Is he vomiting? Is pain or nausea associated with it? How often does he vomit?

What does the vomitus look like? Color? Odor? Amount? Contents?

Has he had a bowel movement? When? Is he constipated? Does he have diarrhea?

Is he incontinent? What is the color, consistency, amount and odor of the feces? Is there blood, pus or worms in the feces?

Does he void sufficiently? Does he void frequently in small amounts? What is the color, odor and amount of the urine? Is there blood or sediment in the urine?

Does he have difficulty or discomfort passing urine? Burning on urination?

Does he void involuntarily?

#### Intake:

Is he thirsty? Is he drinking enough water? Fruit juices?

Is his drinking water fresh? Can he reach it? Does he have a drinking tube?

Is he on forced or restricted fluids? Is there an Intake and Output sheet with a pencil at his bedside? Have you instructed him on how to keep his record?

Is he receiving an intravenous infusion? Have you checked recently?

Is he eating all his food? Is the tray attractive? Are the dishes and silverware clean?

Is he in the best position to eat? Does he need help? Can he reach his food?

Is he on *nothing by mouth?* Is a sign posted on his bed to that effect?

#### Pain:

Does he have pain/ache? Where is it?

How long has he had it? How severe is it? Is it sharp, dull, aching, cramping, knife-like?

Is the pain constant? Intermittent?

Is he nauseated with the pain?

Does he assume a special position to relieve the pain?

Does he have a medication ordered to relieve the pain? When was the last time he had the medication? Did the medication relieve him?

Has the pain and its description been reported and recorded?

#### Wounds:

What is the condition of the wound? Is it clean? Reddened? Swollen? Painful?

Is a discharge present? What is its color? Odor? Consistency? Is it bloody?

Does he have a dressing? Does it need changing?

#### Patient's bedding:

Does he have enough covers? Too many?

Is his bed linen clean? Wrinkled? Wet?
Soiled?

Is the bottom sheet tight and smooth? Are the top covers light and loose?

#### Appliances and apparatus:

Does the patient require an air ring, sandbags, bed cradle, extra pillows for support or comfort? Does he have them? Are they positioned correctly?

Does the patient have a cast? Is there pressure anywhere? Are there rough edges on the cast?

Is the cast dry? Are there cracks in the cast? Is the patient in traction? Are the weights hanging free?

Is the patient up in bed?

Is the rope in the pulley groove? Is the traction pulling in the desired way?

Is the frame causing pressure? Is the frame well padded?

Is his foot or hand supported?

The preceding questions have all been in relation to the patient himself, now consider his environment.

#### The Ward

#### General appearance:

Does the ward look clean? Orderly? Pleasant?

#### Noise:

Is the ward noisy? Is there loud talking, laughing?

#### Ventilation of ward:

Is the air fresh? Stale? Are there odors?

#### Temperature of the ward:

Is it hot and stuffy?

What does the wall thermometer read?

Is the ward warm enough for the patient's bath? Is the ward cool enough for comfortable sleeping?

Is the patient in a draft?

#### Ward lights:

Are they glaring? Bright enough? Shaded? Are they shining in the patient's eyes?

#### Patient's unit:

Is the unit clean, orderly? Complete? Is his bedside stand within his reach? Is his signal cord within his reach?

#### PLANNING PATIENT CARE

The doctor's orders and the observations you make are used in developing a nursing care plan for your patient. Because each patient is an individual who is affected differently by his condition and environment, each requires a plan which will meet his needs. Since each patient may be given nursing care by several personnel over a 24-hour period, the written plan should be explicit

enough to provide continuity of that care. The plan should be flexible and adjusted as the needs of the patient change.

List all the things you must do for, to, and with your patient. When making this list consult the Doctor's Order Sheet and patient's chart in conjunction with the Check List for Observations. In addition, refer to the Ward Report Book or the Nursing Care Plan (NAVMED 1350) in the Visible File Book, whichever is in use at your station.

#### Planning for Group of Patients

After you have assembled your plans for each of your patients, make a plan to meet the needs of

all of them as much as possible. Plan around those items which must be done at a specified time. (Example: Lunch at 11:30.) Use the Ward Routine as a master plan. Plan to give the greatest portion of your time to your sickest patients. Plan to complete one thing before starting another. (Example: Do not start a bed bath for one patient at 0810 if you must take another patient to X-ray at 0815.)

Making plans to fit the needs of your patients takes experience. As your powers of observation develop, the quality of your patient care plans will improve. Seek the guidance of the Nurse Corps officer or medical officer on the ward in improving your patient care.

#### VITAL SIGNS

Temperature, pulse, respiration (TPR) and blood pressure (BP) are called the vital signs because they give important and vital indications of the condition of the patient. The measurement of these symptoms and their relationship to each other aid the doctor in making a diagnosis and prescribing treatment and may help the corpsman determine the amount and kind of nursing care necessary for his patient.

#### **TEMPERATURE**

Temperature is the degree of heat in the body. It is the balance between heat produced and heat lost by the body. When the balance is disturbed, deviations of body temperature result. Deviations above the normal range are called elevations

or fever; those below normal range are called subnormal.

Normal temperature.—The normal range is 97° to 99° F. (mouth); 98° to 100° F. (rectum); 96° to 98° F. (axilla). The normal temperature is usually at its lowest point in the early morning and at its highest in the late afternoon.

Fever.—Fever may begin suddenly or gradually and its course may be constant, remittent or intermittent.

A constant fever is one in which the temperature remains elevated at about the same level during a period of 24 hours or longer.

A remittent fever is one in which the temperature rises and falls in a moderate range but does not approach normal.

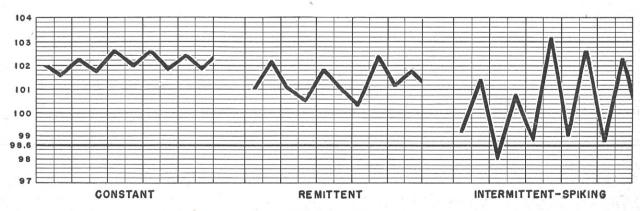


Figure 11.—Types of Fever.

An intermittent fever is one in which the temperature rises and falls in a great range, approaching normal or below in a 24-hour period. Fever may subside in two ways:

- 1. Suddenly by crisis in which there is an abrupt drop to normal with dramatic improvement of the patient.
- 2. Gradually by lysis in which the return to normal extends over a period of days or weeks.

Subnormal.—Deviations below normal range. Due to shivering mechanism of the body, this type of temperature is not often encountered except in certain periods of extreme illness when the subnormal temperature would indicate body resistance is being overwhelmed. It is also found in many chronically ill, starving, cachectic or emaciated patients.





Figure 12.—Types of Thermometers.

Taking the temperature.—Body temperature is measured by the clinical thermometer. The thermometer is scaled in the Fahrenheit system and calibrated in 2/10°.

Routes of measurement are:

- 1. By mouth which is the easiest and most often used route. The thermometer is left in place 3 minutes.
- 2. By rectum which is the most accurate, and is used for children, delirious or unconscious patients, and patients who are mouth breathers, who cough frequently, or who have mouth surgery. The thermometer is held in place 5 minutes.
- 3. By axilla which is least accurate and used only when mouth and rectal routes cannot be used. The thermometer is held in place 10 minutes.

Shaking down the thermometer:

- 1. Stand in clear space away from bedside table.
- 2. Hold thermometer firmly at top between thumb and first two fingers.
- 3. Shake with loose wrist movement as though shaking water off the hand.
  - 4. Shake thermometer down to 95° F. or below.

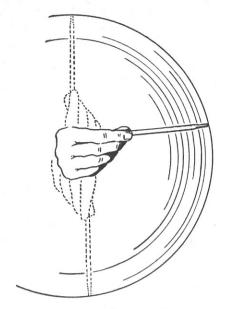


Figure 13.—Shaking Down the Thermometer.

Reading the thermometer:

- 1. Stand in a good light.
- 2. Hold thermometer at the stem end, ridge side toward you.
- 3. Read the scale to include the degree and the nearest 2/10 of a degree.

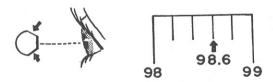


Figure 14.—Reading the Thermometer.

#### **PULSE**

Pulse is the alternate contraction and dilation of the arteries due to the pumping of the blood by the heart. Changes in the character of the pulse may be due to any factor which interferes with the function of the heart, the volume of the blood, and the elasticity of the blood vessels. Therefore, the measurement of the pulse is a valuable means of learning the condition of the heart, blood vessels, and general condition of the patient.

Normal pulse.—The pulse rate even in good health varies with the individual. The rate is faster in infants and young children, slower in aged persons, faster in women than in men, and is affected by exercise, fatigue, and emotions. The

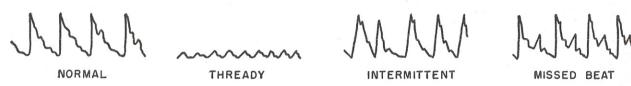


Figure 15.—Variations of Pulse.

normal range for adult women is 72 to 80; for adult men 62 to 72 pulsations per minute. The pulse rate usually increases 10 beats for each degree rise in temperature. The normal pulse should feel firm, smooth, straight, and elastic under the finger tips and should be regular in rate and rhythm.

Taking the pulse.—The pulse may be taken wherever an artery lies near the surface of the body or over a bone. The most frequently used site is the radial artery on the thumb side of the wrist. Other arteries which may be used are the temporal (side of the head in front of the ear); the carotid (front side of neck, may often be seen beating); dorsalis pedis (the top of the foot). In the measurement of pulse, the pulse rate (number of beats per minute), the force (strength or weakness of beat), the rhythm (regular or irregular space between beats), and the volume (full or soft) are noted.

The pulse is usually taken at the same time the temperature is taken and whenever the patient shows a change in condition, postoperatively while recovering from anesthesia, when getting out of bed for the first time, and when receiving medications affecting the pulse.

#### Variations of pulse:

Normal—regular rate, rhythm, force, and volume.

Missed beat—regularly irregular in rhythm and rate; may be irregular in force and volume.

Intermittent—irregular rhythm and rate; may be irregular in force and volume.

Thready—rapid, running, difficult to count or to determine quality.

# Procedure for Taking an Apical-Radial Pulse PURPOSE:

To compare the pulse rate of the heart (apex) and radial artery. (Two corpsmen are necessary to carry out this procedure because the two pulses must be taken at the same time to compare rates.)

#### EQUIPMENT:

Stethoscope
Watch (with second hand)
Alcohol sponge

#### PROCEDURE:

#### Preparation of patient:

Patient lying quietly in bed.

Open pajama coat; expose chest.

First corpsman on left side of bed:

Place stethoscope in ears, earpieces facing forward.

Locate apical pulse (slightly below and to the right of the left nipple).

Listen to the sounds for a few minutes, until the rate and rhythm are familiar. The sounds will be somewhat like lub-dub, lub-dub; each lub-dub is one beat.

Second corpsman on right side of bed:

Locate radial pulse.

Hold watch so that it can be seen by both corpsmen.

At signal of the one taking the apical pulse, both corpsmen count pulses for 1 minute. Recheck.

Replace pajama coat; leave patient comfortable.

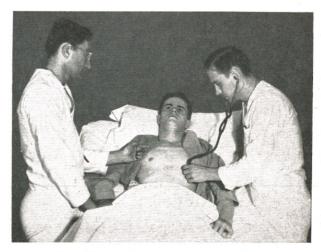


Figure 16.—Taking an Apical-Radial Pulse.

Wipe earpieces of stethoscope with alcohol sponge.

Record on patient's chart in observation column of Nursing Notes. Use Plotting Chart if pulses are to be recorded graphically.

## RESPIRATION

Respiration is the act of breathing in (inhaling) and breathing out (exhaling) air by the lungs. Oxygen is needed by the body; the act of respiration supplies this need.

Normal respiration.—The normal respiration is regular in rate, rhythm, and depth and is performed without pain, strain, or difficulty. The normal rate is rapid in infants and in young children, slow in aged persons; ranges from 16-24 per minute in healthy adults and is affected by age, sex, exercise, sleep, and emotional disturbances. The respiration usually increases 1 to 2 in rate with every 10 beat rise in pulse and each degree rise in temperature. Respirations may be controlled to some extent by the patient and should be counted without his knowledge if possible. Respirations may be counted by watching the rise and fall of the chest, listening to patient's breathing, or feeling the chest move up and down.

## Variations of respirations:

Dyspnea—painful, difficult breathing.

Air-hunger—short, gasping breaths followed by a few normal breaths. Cycle is repeated.

Cheyne-Stokes—gradual increase in depth of respirations until dyspnea is reached, followed by decrease until breathing ceases for few moments. Cycle is repeated.

Stertorous—loud, snorting breathing.

Edematous—moist sounds as if air is passing through water.

Taking pulse and respiration.—Have patient lie or sit down. Place his arm and hand in a relaxed position, thumb up, supported on a chair arm, table, bed, or placed across his chest. Locate pulse by placing the first 3 fingers (not your thumb) on the thumb side of patient's wrist. Count pulse rate for 30 seconds, multiply by 2, and record as number of beats per minute. Check again, noting the quality (force, rhythm, volume). If any deviation is noted, take pulse for full minute. With fingers still on wrist, count respirations for 30 seconds; multiply by 2 and record as

number of respirations per minute. If any deviations are noted count respirations for full minute.

Procedure for Taking Temperature (Oral), Pulse, and Respiration

## PURPOSE:

To determine the degree of temperature, the rate and characteristics of the pulse and respiration of the patient or group of patients.



Figure 17.—Thermometer Tray.

#### EQUIPMENT:

Tray with—

- 2 covered containers of isopropyl alcohol 70 percent, or isopropyl alcohol 70 percent with 0.5 percent iodine
  - 6 thermometers—3 in each container of alcohol
  - 1 container of water
  - 1 container of tincture of green soap solution
  - 1 container of cotton squares
  - 1 sputum cup for waste cotton
  - 1 clock or watch with a second hand
  - 1 TPR book
  - 1 pen or pencil

NOTE: Benzalkonium chloride or liquid iodine-type disinfectant may be the solution of choice for thermometers at your station.— If used, omit soap solution.

#### CAUTION:

- 1. Have the patients lying quietly in beds or sitting down in chairs.
- 2. Wait for 30 minutes before taking the temperature of a patient who has had a hot or cold drink or has been smoking.
- 3. Be sure the thermometer is down to 95° F. before placing it in the patient's mouth.

4. Be sure the thermometer is under the patient's tongue.

5. Wipe thermometer with moistened cotton before and after use. Tests at National Naval Medical Center (NNMC) showed the important step in cleaning a thermometer was the mechanical action of rotary motion when wiping.



Figure 18.—Taking the Temperature, Pulse and Respiration.

#### PROCEDURE:

- 1. Remove a thermometer from the first container of alcohol.
- 2. With a cotton square and in a rotary motion, wipe the thermometer from stem to bulb. Shake down thermometer to 95° F.
- 3. Place thermometer under the first patient's tongue; caution him to keep his lips closed.
- 4. Distribute the other thermometers to the second and third patients in the same manner.
- 5. Take the pulse and respirations of the third patient. Record in book.
  - 6. Repeat step 5 for the second and first patient.
- 7. Remove the thermometer from the first patient's mouth.
- 8. Moisten cotton square with soap solution; wipe the thermometer from stem to bulb in a rotary motion.
- 9. Moisten a cotton square with water; wipe the thermometer from stem to bulb in a rotary motion.
- 10. Read the thermometer and record reading in the book.
- 11. Place the thermometer in the original alcohol container.

- 12. Repeat steps 8 through 11 for the second and third patients.
- 13. Remove the thermometers from the second alcohol container.
- 14. Repeat steps 2 through 12 for the next three patients.
- 15. Continue alternate use of the thermometer containers until all patients' temperatures have been taken.
- 16. Record temperature, pulse, and respiration on SF 511 of each patient's chart. Describe abnormal characteristics of pulse and respiration in Nursing Notes.

## Care of Equipment

#### After each use-

- 1. Remove waste.
- 2. Reset tray.
- 3. Stow in proper place.

## Daily-

- 1. Wash all containers and tray in hot soapy water, rinse, and dry.
- 2. Wash each thermometer in cool soapy water; rinse under running water; dry.
  - 3. Refill and reset tray.

NOTE: Where sufficient thermometers are available for all patients, follow the procedure as outlined in Thermometer Technique in a Communicable Disease Ward.

## Procedure for Taking a Rectal Temperature EQUIPMENT:

Trav with—

Rectal thermometer in 70 percent isopropyl alcohol

Container soap solution

Container cool water

Container cotton squares

Sputum cup for waste

Water soluble lubricant on tissue

#### CAUTION

- 1. Wait for 30 minutes before taking the temperature after the patient has had an enema.
- 2. Use only a stub bulb thermometer expressly made for rectal use.
  - 3. Be sure to lubricate the thermometer.
  - 4. Hold the thermometer in place.

#### PROCEDURE:

- 1. With cotton square wipe down thermometer.
- 2. Shake down and lubricate thermometer.
- 3. Turn patient on his side.

- 4. Insert thermometer about 1½ inches into rectum in an upward and forward direction.
  - 5. Hold thermometer in place 5 minutes.
  - 6. Remove thermometer.
- 7. Moisten cotton with soap solution, wipe down thermometer; repeat, using water.
  - 8. Read thermometer; place in alcohol.
  - 9. Take pulse and respiration.
  - 10. Record TPR in book.
- 11. Record "R" (for rectal) above temperature in book and on patient's chart.

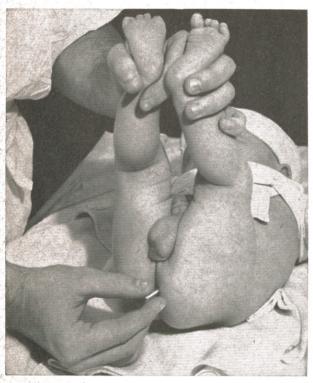


Figure 19.—Method of Holding Infant's Legs.

#### For an infant:

- 1. Steps 1 and 2 above.
- 2. Unpin diaper.
- 3. Lift infant's legs with one hand, holding at the ankles (fig. 19).
- 4. Insert thermometer ½ to ¾ inch into rectum. Hold in place 5 minutes.
  - 5. Proceed as in steps 6 through 11 above.
  - 6. Repin diaper.

Procedure for Taking an Axillary Temperature EQUIPMENT:

Same as for an oral temperature plus hand towel.

#### CAUTION:

- 1. Be sure the axilla is dry.
- 2. Be sure the arm is pressed closely to the body.

#### PROCEDURE:

- 1. Wipe axilla dry.
- 2. Place the thermometer in axilla. Have patient grasp his opposite shoulder and press his arm against his body.
  - 3. Leave in place 10 minutes.
  - 4. Proceed as in Oral Temperature instructions.
- 5. Record "A" (for axillary) above temperature in book and on patient's chart.



Figure 20.—Taking an Axillary Temperature.

#### **BLOOD PRESSURE**

Blood pressure is the force that the blood exerts against the walls of the vessels through which it flows. The blood pressure is commonly meant to be the pressure in the arteries. The pressure in the arteries varies with the contraction (work period) and the relaxation (rest period) of the heart. When the heart contracts, the blood in the arteries is at its greatest pressure. This is called the systolic pressure. When the heart relaxes the blood in the arteries is at its lowest pressure. This is called the digstolic pressure. The difference between both pressures is called the pulse pressure.

Normal blood pressure.—A systolic pressure of 110 to 136 millimeters of mercury and a diastolic pressure of 60 to 90 mm. may be considered as being within the normal range. The pulse pressure is usually about one half the diastolic pressure.

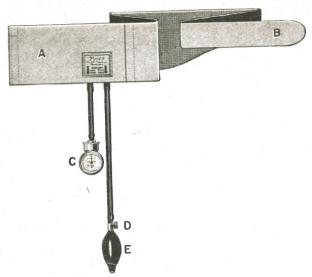


Figure 21.—Diagram of Blood-Pressure Apparatus (sphygmomanometer, aneroid type).

Measurement.—The blood pressure is measured in the brachial artery by means of a sphygmomanometer and a stethoscope. The cuff of the manometer (containing a rubber bladder) is wound about the upper arm and is inflated with air until the air pressure inside the cuff equals the pressure of the blood inside the artery and the walls of the artery collapse. The air in the cuff is then slowly released until the first regular sound is heard; this is the systolic pressure. The air is further released until a change in the character of the sound is heard; this is the diastolic pressure.

## Procedure for Taking a Blood Pressure Reading PURPOSES:

To determine the systolic and diastolic blood pressure in the brachial artery. To determine the pulse pressure.

#### EQUIPMENT:

Stethoscope Sphygmomanometer Alcohol sponges

## CAUTION:

- 1. Explain procedure to the patient to lessen his fears or apprehension.
- 2. Patient must be at rest, lying down in bed or sitting quietly in a chair with the arm to be used well supported.
- 3. Be sure the cuff of the apparatus is completely deflated and the indicator registers zero before starting the procedure.

- 4. Wipe the bell and earpieces of the stethoscope with an alcohol sponge before starting the procedure.
- 5. When repeated readings are ordered, the same arm should be used and the same person should carry out the procedure.

#### PROCEDURE:

- 1. Push patient's sleeve well above his elbow; if sleeve is tight, remove it.
- 2. Starting with the wide portion of the cuff (A) wrap it snugly and smoothly around the arm above the elbow. Tuck narrow end (B) under the previous turn (fig. 21).
- 3. Clip indicator (C) on the cuff (aneroid type), or place apparatus on a level surface (mercury type).
- 4. With the fingers, locate the brachial pulse at the bend of the elbow.
- 5. Place the stethoscope in the ears, earpieces facing forward.
- 6. Place the bell of the stethoscope over the spot where the brachial pulse was felt.
  - 7. Tighten thumb screw of the valve (D).
- 8. Holding the stethoscope in place, inflate cuff with the bulb (E) until the indicator reads 200 mm. or to 20 mm. above where the sounds are no longer heard.
- 9. Loosen the thumb screw of the valve to allow the air to escape slowly.
- 10. Listen for the sounds, watch the indicator and note the number on the indicator where the

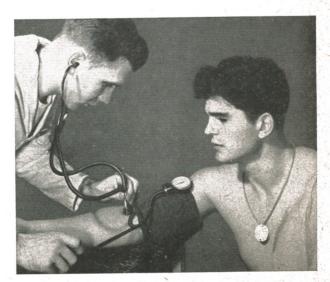


Figure 22.—Taking a Blood Pressure Reading.

first distinct rhythmic sound is heard. This is the systolic pressure.

- 11. Continue releasing air from the cuff and note the number on the indicator at which the sound changes to a dull muffled beat. This is the diastolic pressure.
- 12. Open the valve completely, releasing all the air in the cuff.
  - 13. Repeat steps 3 through 12 to recheck.
- 14. Remove the cuff from the arm; roll cuff from the narrow to wide portion and place it in its case. Be sure the tubing is not pinched or kinked.
- 15. Wipe earpieces and bell of stethoscope with an alcohol sponge.
- 16. Record the systolic pressure over the diastolic pressure on the TPR sheet (SF 511) or graph on the Plotting Chart as directed.

## THE PATIENT'S CHART

Review—Check List for Observations

Abbreviations and Symbols

Some Symptoms To Be Observed and Terms To Use in Recording Them

#### PURPOSES:

To provide a clear and concise record of the patient's condition and progress throughout each 24-hour period; to record effects and results of treatment the patient is receiving; to aid the doctor in making a diagnosis and in prescribing treatment; to help the corpsman adapt his nursing care to fit the needs of the patient; to provide records for study, research, and statistics.

#### INDICATED:

For all patients.

#### Corpsman's Responsibility

The corpsman is responsible for maintaining the temperature, pulse and respiration sheets, nursing notes, intake and output records and for plotting charts when used. He is also responsible for stapling or inserting other forms or reports in the chart.

## Arrangement of Patient's Chart

The patient's chart is composed of a series of standard clinical record forms. Each form is assigned a number in the series ranging from Standard Form (SF) 501 to 539 and each form has been designed for a specific purpose. All forms will not be required for all patients, but each patient should have the following basic clinical chart arranged in *numerical* and *chronological* order:

SF 501--Diagnostic Summary

SF 502—Narrative Summary

SF 504—History Part I

SF 505—History Parts II and III

SF 506—Physical Examination

SF 508—Doctor's Orders

SF 509—Doctor's Progress Notes

SF 510—Nursing Notes

SF 511—Temperature—Pulse—Respiration

SF 514—Laboratory Reports (Reports 514-A—Q are stapled to this sheet)

SF 519—Radiographic Report (Reports 519-A are stapled to this sheet)

When other forms in this series are used they should be inserted into the chart in numerical order. All clinical records pertaining to each patient should be kept together in one chart holder.

## Appearance of Chart

1. Each sheet of the patient's chart should be neat and pleasing to the eye. When writing an entry, try to use lettering that is uniform in height and spacing. Try to leave a one letter space between words.

## A B C D E F G H I J K L M N O P Q R S T U V W X Y Z a b c d e f g h i j k l m n o p q r s t u v w x y z

One letter space between words

Figure 23.—Guide for Lettering,

2. Each sheet of the chart should have complete identifying data at the foot of the page. These data should be legible, correct and complete: Patient's last name, first and middle names, service number, date of admission, rank/rate, ward, hospital or medical facility. These data may be typed, lettered or mechanically imprinted.

#### Mechanical Imprinting

The mechanical imprinter is used for patient's identifying data on the clinical records. When used properly and maintained in good working order, the imprinter will save time and assure legible data.

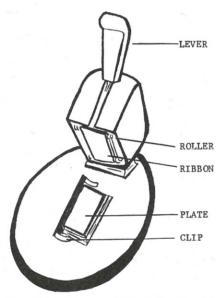


Figure 24.—Diagram of Mechanical Imprinter.

#### Use of Imprinter

- 1. Insert patient's plate, face up, into the bed of the machine, under the clips.
  - 2. Position the patient's record over the plate.
- 3. With the left hand holding the record, lower the head of the machine with the right hand and push the lever downward to the limit of its stroke.
- 4. Raise the head of the machine and remove the imprinted record. Check the record for complete and legible imprinting.
- 5. Remove the patient's plate and place it in the appropriate place in the ward file.

#### Care of the Imprinter

1. If a dater is included in the ward imprinter, it must be set daily using a wooden stylus, never with a metal object.

- 2. The face of the patient's plate should always be clean and even. (When adhesive tape is used to identify a patient's plate more readily, it should always be placed on the back of the plate.)
- 3. If the imprinted record is not legible, check the following:
  - a. Ribbon—Is it dry? Torn? When was it last replaced?
    - b. Uneven printing—
  - (1) The plate in the bed of the machine may be off balance.
  - (2) The roller in the head of the machine may be worn and need replacement.
  - (3) The patient's plate may have been cut unevenly.
- 4. If the ribbon, machine plate or roller is defective, return machine to the proper department for repair. If patient's plate is defective, request a new plate be made.

## NURSING NOTES (SF 510)

The recording of complaints and symptoms of the patient, his prescribed care and his reaction to this care is the accepted responsibility of the nursing personnel. It is an account of the patient's condition and progress.

The recordings must be accurate, concise, clear, complete, and in language which is understood by all who have access to the chart. When abbreviations or symbols are necessary, use only those listed in this handbook.

The entries must be factual and truthful without interpretation. If interpretation of a patient's subjective symptom is necessary, qualify the statement by "appears" or "seems." Wherever possible, record patient's complaints in his exact words. Each entry need not be a complete sentence but should contain sufficient words to convey a complete thought.

#### General Instructions

- 1. All entries shall be lettered in black or blue-black ink. Black or blue-black ballpoint pens may be used. (Entire 24-hour period.)
- 2. Navy date and time shall be used (1 Mar. 1959, 0220):
  - a. Date shall appear at midnight, at the beginning of each new page, on admission and discharge.
    - b. Hour shall accompany each new entry.

- 3. Entries shall be signed with the full signature of the person making them. The signature may be placed at the end of the day's entries if the same person has made all of them.
- 4. When an error is made, draw a straight line through error. Write "Error." If for any reason a page must be copied, it must be marked "Copy" and the original must be retained on the chart. No erasures are permitted.

## Nursing Notes on Admission

Include in the admission notes:

- 1. Manner of admission.
- 2. Chief complaint and other complaints of the patient.
- 3. Your observations of the patient and any pertinent information received from relatives or others accompanying the patient.
- 4. Abnormal characteristics of the pulse and respiration must be fully described. (Record TPR only on SF 511.)
  - 5. Notification of the doctor.
  - 6. Any nursing measures given.

CLINICAL RECORD 2300 adm. via wheel chair. Tobal stat. Placed in Fowler's 3Mar position for comfort. States: I can't breathe when flat in bed. " Complains of pain in Right Anterior chest on inspiration appears worried about condition, anxious to see doctor. Ankles and feel edematous; Cips and fingernalls exanotic Large bruise approx 6 in. long, 3 in wide on outer aspect, left thigh that hard, dry hacking cough when he attempts to talk or move about in bed. P. 92-fair volume regularly irregular rhythm easily compressed at wrist R26-dyspner shallow, grunting in character. Appears acutely ill. Wife states. the fell against the plane about a week ago. He has been taking Digitalis griss daily for past 2 years but has not stayed on his Low Sodium diet for past 2 months the insisted on shoveling snow yesterday, although he us he shouldn't. Hed Water HN 2315 Examined by DR. Akert Placed on S.L. Wife notified by doctor S.L. report to OOD. 2345 Morphine Sulfate grilo 2400 Last rites administered by Chaplain Good 4 Mar Digalen 200 (M) P. 92
Renicillin 600 000 U. NO KNOWN Allergy To DRUG Oldo Visited by Dr. Andrew from the Wed Watch, HN REGISTER NO. 4 15 93 C Wd 2 J654321 2300 3-3-59

Figure 25.—Sample Admission Notes (SF 510).

VETERAN IRA BEN USNH BOWMAN

## Nursing Notes During Hospital Stay

Include in the notes:

- 1. All observations made. Objective and subjective symptoms. The effects of treatments and medications. Changes in the patient's physical condition or behavior.
- 2. All supportive nursing care given, such as hygienic, comfort and diversional measures. Indicate the degree to which the patient participates in his care.
- 3. Use of restraints, siderails, and reasons why applied.
  - 4. Notification of doctor.
  - 5. Doctor's visit other than routine sick call.
- 6. Treatments and consultations received in other departments, clinics.
- 7. Working order of apparatus in use, such as Wangensteen, tidal drainage.
  - 8. Specimens sent to laboratory.
- 9. Any accident or unusual happening. Record time and how the event occurred, the effect on the patient, whether the doctor was notified and the time he examined the patient, and the completion and submission of special report if one is required at your station.
- 10. Serious or critical lists. Record the time the patient is placed on the S.L. or C.L., whether next of kin are present at the patient's bedside, and the completion and forwarding of the S.L. or C.L. to the proper departments as required by your station. Follow the same procedure when the patient is removed from the S.L. or C.L.
- 11. Administration of religious rites. Record the time and by whom the rites were administered.
- 12. Diets. Record the type of diet. Record patient's likes and dislikes of foods and the amount of food he eats if such is significant in his care.
- 13. Nourishment. Record the type of nourishment when significant in the care of the patient. If patient is on measured intake and output use DD Form 792.
  - 14. Single order for medication or treatment.
- a. Medication. Record time in hour column, name of drug, dosage and manner of administration if other than by mouth, after it has been given.
- b. Treatment. Record time in hour column, name of treatment, amount of solution if used, and the duration of treatment if for prescribed time, after it has been given.

	CLINICA	AL RECORD.	NURSING (Sign a					
	HOUR	T	OBSERVATIONS	1 10112)				
1959	A.M. P.N		Include medication and treatment who	en indicated				
6 Feb		Regular D	Regular Diet 73-113-43.					
		Phenobarb		)- DC				
	0930	Physiothe	rapy					
	0830	Self care	supervised Able to ra	use right	arm to comb			
	1000	Complains	of severe aching pan	IN FIGAT	shoulder.			
		Alexander and the second	iey added another 1011		today."			
	1015	APC tab in	for pain.					
		tor water	bottle to shoulder; arm	elevated	on pellows			
	1100	More com	fortable but appears a	liscourage	d. Discussed			
		his progre	ss & him showed his i	mproveme	ut over past			
		2 months; u	reged him to help other	patient	Z Similiar Con			
	1200	Eating Lun	ch & other patient; both	checking	each other or			
		USING COP	rect movements					
	140	appears n	nore cheerful states You	Know, that	tother fellow			
	-	really need		Symp	atics HN			
	150	Morphine	Sulf gr/64) John Jo	neo HN				
_	160	Refused p	henobarbitul States: I de	ont need the	at pill anymore			
	170	100 00 00	tying shoelace, strikin	,	,			
-		bedside tab	ble Complains of Squere		IN IN RE Shoul			
		Dr. Notifies						
	33		by Dr. Kildare. Accident	report	completed			
	1715	Morphine	Suf gr 16 for pain.	John Jone	o HN			
23-40		(For typed or written entries) middle, grade, date; hapital	gue: Name - last, tost. REGISTI		WARD NO.			

Figure 26.—Sample Nursing Notes (SF 510).

15. Repeated or running orders for diet, medications and treatments. Record the first time of the day they are given. Indicate the hour and place your initials above the hour. Each time the diet, medication or treatment is repeated, enter the hour and your initials above the hour. When a diet, medication or treatment is not given for any reason, record the hour, circle and initial it, and record the reason for the omission in the body of the Nursing Notes at the appropriate hour. When a diet, medication or treatment is discontinued, enter DC and initial above the entry.

# TEMPERATURE—PULSE—RESPIRATION, FAHRENHEIT (SF 511)

#### General Instructions

1. Form SF 511 is usable for one week. The graph is divided into seven major columns—one for each day. Each daily column is subdivided into two parts—a.m. and p.m. Each subdivision is further divided by two vertical dotted lines. Note that the dots in the lines divide the horizontal spaces into five even divisions.

- 2. Use black ink for all entries. Fill in heading at top of page. The day of admission is the first hospital day. The day of operation or delivery is lettered "Operation" or "Delivery"; the following day is the first postoperative or postdelivery day. Record the hours TPR's are taken.
- 3. After patient's name at the bottom of page, print his serial number, rank or rate, branch of service, or civilian status.
- 4. For every four hour and twice-a-day temperature and pulse readings, place the recordings within the dotted lines.
- 5. For four-times-a-day readings, place the recordings on the dotted lines.
- 6. Use the same symbol, a dot the size of a pinhead, for temperature and pulse. Record by date corresponding vertically to hour, horizontally to scale. Connect dot with previous recording by a solid line.
- 7. Record number of respirations in space corresponding vertically to hour.
- 8. Record blood pressure by number, corresponding vertically to hour. When blood pressure is ordered for more than three times a day, use a Plotting Chart (SF 512) or a separate SF 511.

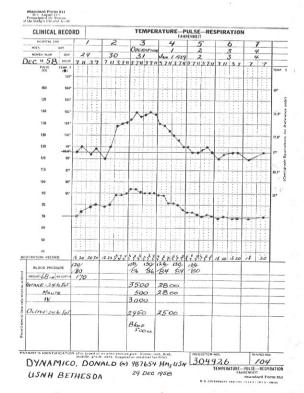


Figure 27.—Sample TPR Sheet (SF 511).

- 9. Record height and weight on admission. Record subsequent weight in correct date columns.
- 10. The blank space below the graph may be used as desired, for example: intake and output 24 hour totals, blood transfusions, totals of specific drugs.

## PLOTTING CHART (SF 512)

This form may be used for additional graphic representation of data.

Suggestions for use:

Blood pressure recording.

Comparison of intake and output.

Weight chart.

Drainage chart.

## General Rules for Constructing Graphs

- 1. Purpose of graph must be known; print purpose of graph in upper left-hand space provided.
- 2. A graph should always read from left to right.
- 3. Measurement should be calibrated along vertical portion of graph.

- a. Scale should be at a definite and uniform rate of progression. *Example*: 0—10—20—30.
- b. Scale should be labeled at top to show units of measure. *Example*: cc.—lbs.—mm.—Gm.
- 4. Passage of time should be noted along horizontal portion of graph. *Example:* Dates and hours measurements are made.
- 5. Meaning of symbols used in graph should be shown in a key to the side of the graph.
- 6. When lines are used in graphing they should be labeled to the left of their starting points.

# INTAKE AND OUTPUT WORKSHEET (DD SF 792)

Whenever a record of intake and output of fluids by the patient is required, the Nursing Service—Twenty-four Hour Patient Intake and Output Worksheet (DD 792) should be used. The worksheet is self-explanatory.

At 2400 hours daily, the intake and output totals should be recorded in the Nursing Notes (SF 510) or TPR Sheet (SF 511) of the patient's chart.

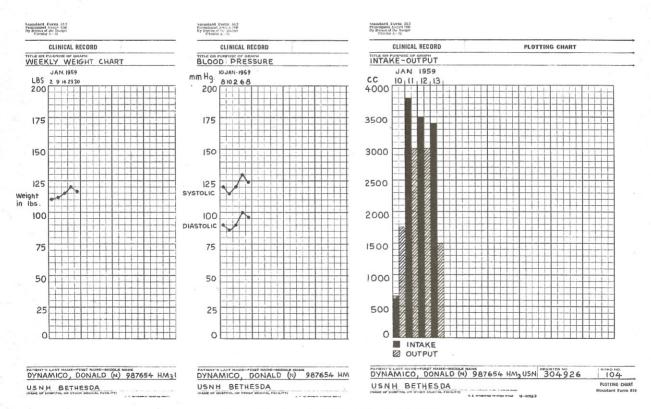


Figure 28.—Sample Plotting Charts (SF 512).

1 23	* INTAKE EQUIVALENTS (Serving In		1	ONTE 3 MAR 19	159
	MEDICINE GLASS (1 os.) 30 HALF PINT	P BOWL	. 240	FROM 2400 HOURS TO 24	OO HOORS
	SMALL FRUIT CUP120 LARGE SOL COFFEE CUP120 LARGE WAT LARGE COFFEE MUG180 CHINA PIT	TER GLASS	. 240 . 480	TOTAL NUMBER HOURS COVER	
-	INTAKE*			оитрит	
HOUR	BY MOUTH State type of fluid & if by tube add (T)	AMOUNT (cc)	HOUR	URINE If by catheter add (C)	AMOUNT (cc)
0300	Water	60	0400	Dark Omber	90
07/5	Pineapple juice	120	1100	DANK amber (C)	120
/	( OFFEE	90	1	2	
1000	Milk Spup	120	2400	Retention Catheten	
1130	Spup	120		aark amber	300
1400	H20	SIPS	1		1
1630	~	30			
1800	11.	60			
1900	Swaer ale	120			
2030	TEA	120			
2130	H20	90			
2/30	Water	60			
		1	1.	ORA INAGE	
		-	2700	GaSTRIC-Yel green	300
	-				
					-
· ·		-	-		
				ENESIS	180
			1200	Sour odor curds green undigested food	700
		-			
	INTRAVENOUS, SUBCUTANEOUS, CLYSIS (Speci)	(y)		STOOLS (Character, color)	
1300	D/W 5%	1000	0900	Jost brown	Large
000		1	1200	Thin watery light brown	,
1600	D/W 5%	2000		approx	400
	GRAND TOTAL INTAKE (cc)	3990		GRAND TOTAL OUTPUT (cc)	1390+
	-12 P NONE Wd 4	,,		INSTRUCTIONS	
J293	847 1600 2-22-59 444 CTC USN		Space if used followi	to left is for mechanical imp . If typed or handwritten, em ag:	ter the
	T JOSEPH C BOWMAN		REGISTE	'S LAST NAME, FIRST NAME, MIDE R NUMBER; WARD NUMBER;	
			I HAMP OF	HOSPITAL OR OTHER MEDICAL PAC	TILITY

Figure 29.—Sample Intake and Output Worksheet (DD 792).

When DD Form 792 is not available:

- 1. Rule a sheet of paper into columns for time, intake, and output.
- 2. Each time a patient drinks, is fed through a gastric tube, or receives fluids by intravenous or hypodermoclysis, record time and the amount as intake. The following equivalents may be used:

Medicine glass	30 cc.
Small fruit cup	120 cc.
Coffee cup	120 cc.
Large coffee mug	180 cc.
Half pint milk	$240~{\rm cc}.$
Large soup bowl	240 cc.
Large water glass	240 cc.
China pitcher	480 cc.

- 3. Each time a patient voids, or loses fluids by vomiting, gastric or urinary drainage or diarrhea, record time and the amount of output.
- 4. Total intake and output columns at 2400 and record in the Nursing Notes (SF 510) or TPR Sheet (SF 511) of the patient's chart. Start a new sheet at 0001.

## PROVIDING FOR THE PATIENT'S COMFORT

Review——Chapter II, "The Skeletal System"

"The Muscles"

"The Digestive System"

"The Excretory Systems"

Chapter V, "Food in Health and Disease"

Chapter VI, "Personal Hygiene for Individual Protection Against Disease"

Comfort is the enjoyment of physical and mental well-being. This applies to the corpsman as well as to the patient.

One of the essentials of physical comfort is good posture. Good posture is the position of the body in correct alignment when standing, sitting, lying down, or in any phase of activity. The coordinated use of the body parts to produce motion and maintain equilibrium is termed body mechanics.

The use of good posture and proper body mechanics by the corpsman when taking care of his patient will serve to:

- 1. Conserve the energy of the corpsman.
- 2. Promote the efficient use of muscles by the corpsman.
- 3. Avoid backstrain and fatigue of the corpsman.

4. Teach his patient, by example, the importance of good posture.

The maintenance of good postural position of the patient while in bed will serve to:

- 1. Promote the proper functioning of the body systems.
  - 2. Promote a feeling of well-being.
  - 3. Avoid fatigue and prevent deformities.

Providing for the mental comfort of the patient includes:

- 1. Adequate explanation of what is to be done.
- 2. Anticipating his wants.
- 3. Listening to his problems and referring him to the proper person or department when necessary.

These are but a few of the ways of providing for the mental comfort of the patient. The corpsman, by experience, will learn to recognize the general reactions of individuals, what causes people to behave the way they do and to use these experiences in providing more complete care for his subsequent patients.

#### MOVING AND LIFTING

The following principles may be applied to any moving or lifting activity as well as to moving and lifting the patient.

- 1. Place your body in correct alignment before starting the activity.
- 2. Place your feet far enough apart to provide an adequate base of support and to maintain balance.
- 3. Hold the object to be carried as close to the body as possible so that the centers of gravity of both will be close together.
- 4. Use the large muscle groups to lessen strain and fatigue.
- 5. Stoop to working level, keeping the back straight.
- 6. Slide, rather than lift a patient or object whenever possible.
- 7. Give adequate support to the object or body to be moved. Obtain help when moving a heavy object or unmanageable patient.
- 8. Work in unison, give signal before starting activity.

#### Methods of Moving and Lifting

#### Prepare the patient and unit:

- 1. Tell the patient exactly what is to be done and how he may help.
  - 2. Bring all needed equipment to the unit.
  - 3. Lock the wheels of the bed.

4. Fold all bedding and clothing so that the patient will not be hampered by them and yet will not be exposed.

## Assume the correct position:

1. Stand, facing in the direction of the move to be made, with the feet apart, one foot well in front of the other (fig. 30).

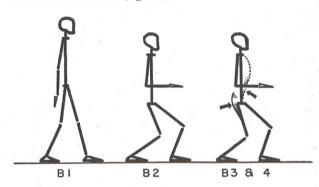


Figure 30.—Diagram. Body in Correct Position for Moving or Lifting.

- 2. Stoop to working level by flexing knees, keeping back straight.
- 3. Place arms under patient, keeping your elbows close to the body.
- 4. Set pelvis by tensing the abdominal and gluteal muscles simultaneously.

## Move or lift patient by shifting own weight from one foot to the other:

1. To move patient toward you, let arms holding the patient slide on the bed, shift your weight from front to rear foot (fig. 30).

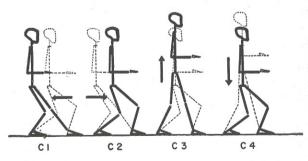


Figure 31.—Body in Motion When Moving or Lifting.

- 2. To move the patient away from you, let arms holding the patient slide on the bed, shift your weight from the rear to the front foot.
- 3. To lift the patient, keep elbows close to your body, straighten knees, equal weight on both feet.

4. To lower patient, keep elbows close to your body, flex knees to working level, equal weight on both feet.

## To Move a Patient Up in Bed (One Corpsman)

Loosen drawsheet. Flex patient's knees, ask him to grasp rungs at head of bed. Assume the correct position behind head of bed. Grasp

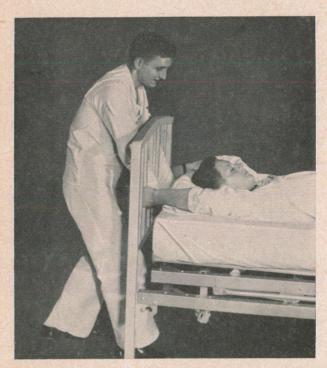


Figure 32.—To Move a Patient Up in Bed.

drawsheet under pillow at patient's head. Corpsman gives signal and moves patient by shifting own weight from front to rear foot. To pull up a mattress: Flex knees to working level—grasp underside of mattress and use the same method.

## To Move a Patient Up in Bed When He Is Able To Assist

Assume the correct position at side of bed. Ask patient to flex his knees and to grasp rungs at head of bed. Place one arm under patient's shoulders and one under the buttocks. At corpsman's signal, patient pushes with his heels, straightens knees, flexes elbows. Corpsman assists by shifting own weight from rear to front foot.



Figure 33.—To Move a Patient Up in Bed When He Is Able To Assist.

## To Move a Helpless Patient Up in Bed With a Drawsheet (Two Corpsmen)

A corpsman stands at each side of bed. Loosen and roll drawsheet fairly close to patient. Flex patient's knees. Both corpsmen assume the correct position. At first corpsman's signal, both move



Figure 34.—To Move a Helpless Patient Up in Bed With a Drawsheet (Two Corpsmen).

patient up in bed by shifting their weight from rear to front feet.

To pull up a mattress grasp underside of mattress, flex knees to working level and use the same method.

## To Help the Patient Sit Up in Bed

Assume the correct position at side of bed. Slip near arm under patient's near shoulder. Ask



Figure 35.—To Help the Patient Sit Up in Bed.

patient to place his arm into same position on your shoulder. Use other arm as support for patient's head. Give signal, raise patient by shifting own weight from front to rear foot. See figure 49, Back Rest Position, for supports.

#### To Move a Helpless Patient Up in Bed (Two Corpsmen)

A corpsman assumes the correct position on each side of bed. Flex patient's knees, ask him to make



Figure 36.—To Move Helpless Patient Up in Bed (Two Corpsmen).

himself rigid. Both corpsmen slide arms under patient's head and shoulders and under patient's buttocks—lock wrists. At one corpsman's signal both move patient by shifting their weight from rear to front feet.

#### To Turn a Patient on His Side

Assume the correct position at side of bed toward which patient is to be turned. Flex patient's knees. Place your hands on patient's far shoulder



Figure 37.—To Turn a Patient on His Side.

and hip. Slowly and gently turn patient toward you by shifting own weight from the front to the rear foot. Check patient's shoulder alignment. See figure 49, Side Lying Position, for correct supports.

## To Help the Patient Sit Up on Side of Bed

Dress patient in pajamas. Fanfold covers to foot of bed. Flex patient's knees, turn him on his side. Assume the correct position. Place one arm under patient's shoulder, the other behind the knees with hand under his lower thigh. Ask patient to place his hands around your neck or on your shoulders. Give signal, slowly bring patient

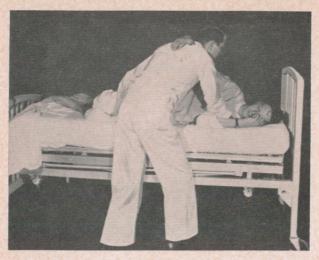


Figure 38.—To Help the Patient Sit Up on Side of Bed.

to sitting position by straightening your knees as you shift weight from front to the rear foot. Support patient's feet on stool or chair.

## To Help the Patient Out of Bed Into Chair

Place chair parallel to bed. Bring patient to a sitting position on side of bed. Dress him in bathrobe and slippers. Allow patient to sit on



Figure 39.—To Help the Patient Out of Bed Into Chair.

side of bed until he is accustomed to this position. Assume the correct position in front of patient. Ask patient to place his hands on your shoulders. Place a hand on each side of the patient, midway between his axilla and hip. Supporting patient, allow him to slide off bed and stand on floor. Pivot with patient, lower him into chair by flexing your knees, shifting weight from rear to front foot, keeping your back straight.

## To Help the Patient Into Wheel Chair

Place chair against bedside table or have another corpsman hold it. Fold back foot rests. Follow instruction under To Help the Patient



Figure 40.—To Help the Patient Into a Wheel Chair.

Out of Bed to a Chair. Assume the correct position of deep knee and hip flexion to adjust foot rests. For wheel chairs with adjustable knee rests, fold back knee rests until patient is seated, then adjust them.

#### To Move Patient From Bed to Stretcher

Place stretcher at right angles to the bed. Three corpsmen assume the correct position at the same side of bed. First corpsman places one



Figure 41.—To Move the Patient From Bed to Stretcher.

arm under patient's shoulders, supporting the head on the crook of his arm, the other arm under patient's back. Second corpsman places his arms under patient's back and thighs. Third corpsman places his arms under patient's thighs and calves. At first corpsman's signal, all slide patient to edge of bed. All corpsmen again assume the correct position and at first corpsman's signal, all lift by straightening knees; then turn and place patient on stretcher.

To move the patient from stretcher to bed—use same method.

## To Move an Injured Arm or Leg

Place pillows in readiness to support extremity. Place both hands beneath the injured limb, at joints above and below the site of injury. Raise limb slowly and gently. Place extremity on pillow, being sure the entire limb is supported. The toes or hands should be slightly higher than the rest of the extremity.

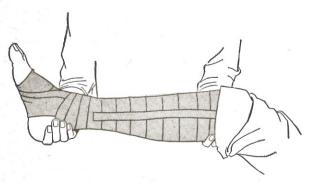


Figure 42.—To Move an Injured Arm or Leg.

## DEVICES FOR THE COMFORT OF THE PATIENT

All devices used for the patient's comfort should:

Be large enough to support a part along its
entire length.

Be firm enough to support, yet not cause pressure.

Promote correct anatomical alignment. Conform to part of body being supported.

The Gatch bed (fig. 43) allows the patient's position to be changed with the least exertion to him. Patients are all different sizes and heights. The breaks in the bed frames for the back and

knee rests are in the same place on all beds.

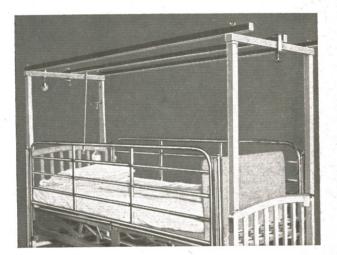


Figure 43.—Bed and Attachments.

Therefore, in most instances, the knee rest will not be usable when the back rest is elevated and vice versa. The knees may be flexed by use of a pillow, rolled sheet, towel, or blanket. The feet should be supported so that they are at right angles to the bed (as in standing position).

Fracture board (fig. 43). A board the width and length of the mattress used to prevent sagging of the mattress. Used particularly in the care of patients with back injuries or fractures.

Balkan frame (fig. 43). An overhead apparatus attached to the bed providing a trapeze and attachments for traction. Used for patients who are in casts, in traction, or who are paraplegics.

Pillows. Various sizes may be used, depending upon the purpose. Place pillows in rubber cases when there is a possibility of soiling them. Follow the rules of Devices for Comfort.

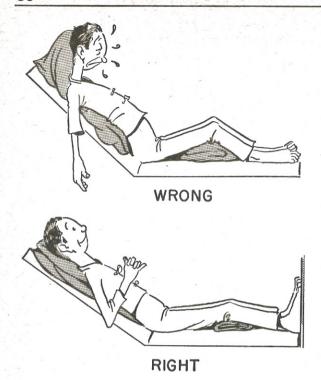


Figure 44.—Proper Use of the Gatch Bed.

Footboard. A board the width of the bed and at least 3 inches higher than the patient's toes used to support the feet. This board will help the patient stay in the correct position by preventing his slipping down in bed and will prevent the bedding from pressing on his toes.

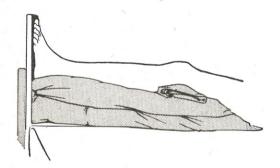


Figure 45.—Footboard.

Air ring. An air ring used to relieve pressure on the coccyx, hips, or on any part of the body. The ring should be inflated just enough to raise the part off the bed. To inflate: Place a paper straw into valve of ring (or cover valve with gauze). Blow up until one-third full of air, close valve.



Figure 46.—Inflating Air Ring.

Place ring inside a cotton pillow cover. Place ring under patient so that the part to be protected is directly over the hole of the ring.

CAUTION: Be sure valve of ring is away from patient's body. For example, between legs when used to relieve pressure on coccyx. If ring is too hard after it is under the patient, open valve and release some air so that the ring fits the patient. A hard ring will cause more pressure than no ring at all. A soft ring does not relieve pressure.

Doughnuts. Sponge rubber or cotton rings, called doughnuts, may be used to relieve pressure on bony prominences (heels, ankles, elbows, shoulder blades). Where available, sponge rubber cut to fit the part to be supported is recommended.

To make cotton rings: Take cotton wadding of sufficient size to support area. Form into a circle; wind 2- or 3-inch bandage around cotton to make an even, fairly firm ring. Finish bandage with a small piece of adhesive tape.



Figure 47.—Making Doughnut.



Figure 48.—Placement of Doughnut.

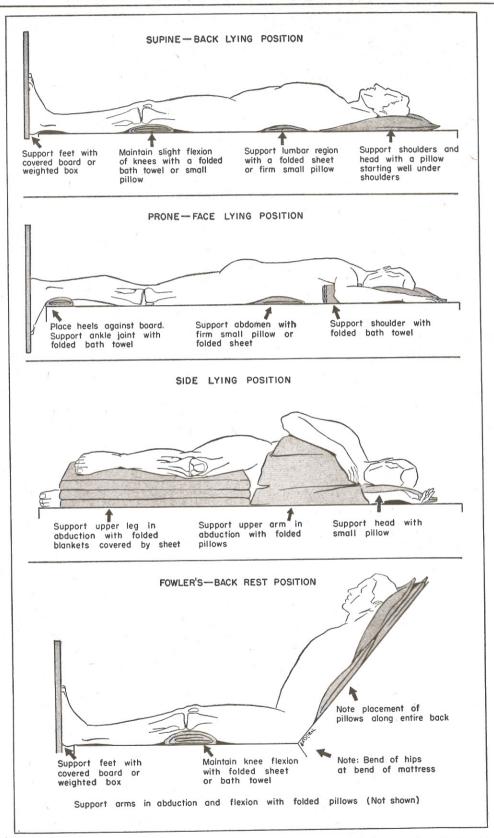


Figure 49.—Positions for Patient's Comfort. Turn page around. Note how anatomical alignment is maintained in all positions.

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4-39

Cradles. These are frames of various sizes used to keep weight of bedclothes off patient's legs, toes, or entire body. Anchor cradle to bed by tying to spring or rungs of bed with bandage or string.

CAUTION: Be sure patient has sufficient covers. He may need an extra blanket over upper part of bed.

Sandbags. These may be used to immobilize or support an extremity. Cover bag with a pillow case. (Special covers for sandbags may be requested to be made by the linen room.)

CAUTION: Be sure sandbag is long enough to support entire limb.

#### POSITIONS OF COMFORT FOR PATIENT

#### To provide good posture for patient:

- 1. Support natural spinal curves by use of back rests, pillows, air rings, and so forth.
- 2. Support feet at right angles to the legs by use of footboards, sandbags, and so forth.
- 3. Change position of patient frequently to prevent pressure on any one part of the body, to avoid strain on joints, and to prevent deformities.
- 4. Encourage patient to move about in bed, to provide exercise, to promote circulation, and to maintain good joint movement and muscle tone.
- 5. Figure 49 illustrates the four principal positions of comfort for the patient.

#### DEVICES FOR THE SAFETY OF THE PATIENT

The patient must be protected from injuring himself or others. The basic safety measure to protect all patients is to have all equipment in good working order. Some patients require additional protection such as side bars, sheet or leather restraints.

#### Side Bars

Side bars (fig. 43) are metal bars, the length of the bed, that serve to keep the patient in bed. Some beds are equipped with bars that slide down when not in use, much like a child's crib. There are detachable bars available for other beds. Side bars are used for patients who are confused, delirious, under sedation, or unconscious. They may also be used as a precautionary measure for patients who are blind or who have had eye surgery.

#### Sheet Restraints

Tucking in the top bedding along the sides of the bed may provide enough protection for the patient. Sheet restraints may be made by:

- 1. Folding a sheet in quarters and applying it across the patient's chest and tying it to the bars under the bed. A doctor's order is required. Care must be taken that this restraint does not interfere with the patient's respiration.
- 2. Folding a sheet diagonally and applying it to the wrist or ankle by means of a clove hitch. A doctor's order is required. Care must be taken that patient's skin does not become chafed.

#### Leather Ankle and Wrist Restraints

These restraints MUST have a doctor's order; must be padded; must be loose enough to permit circulation of the parts of the body restrained; must be placed on opposite sides of the body (right wrist, left ankle); must be slack enough to allow some body movement.

## Applying restraints:

- 1. Pad the wrist or ankle with towel or cotton wadding.
  - 2. Place cuff over pad.
- 3. Pass strap through loop of cuff and under bar of bed.
- 4. Allow enough slack in the strap to permit movement.
  - 5. Lock strap.
- 6. Watch patient for signs of chafing, burning, or pressure sores.

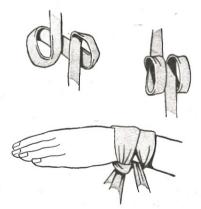


Figure 50.—Clove Hitch Sheet Restraint.

#### PERSONAL CLEANLINESS OF THE PATIENT

The need for personal cleanliness of a sick person is as great or greater than that for a well person. The care of the skin, mouth and hair follows the same general outline you do in your daily life. The amount of assistance the patient will need from you in attending to his personal cleanliness will depend upon the amount of activity permitted him by the doctor, his general and local condition. Most patients prefer to do as much for themselves as possible; others will need to be encouraged to assume their own care.

#### ORAL HYGIENE

#### **PURPOSE:**

To keep mouth clean, refresh patient; to prevent sores, mouth odors; to stimulate appetite.

#### INDICATED:

Morning and evening for all patients.

Every 1 or 2 hours for patients who have mouth injuries or surgery, have sore inflamed mouths, or are on nothing by mouth.

Every 2 to 4 hours for patients who have fever, are unconscious, seriously ill, or dying.

#### **EQUIPMENT:**

Glass of water

Curved basin

Toothbrush, dentifrice

Hand towel

#### PROCEDURE:

#### When patient is able to help himself:

- 1. Place patient in comfortable position on backrest or on his side.
- 2. Arrange equipment within his reach on bedside or overbed table.
- 3. Remove equipment promptly when he is finished.

#### When patient needs some assistance:

- 1. Turn patient on side.
- 2. Place towel under his chin and over bedding (fig. 51).
- 3. Pour water over brush; place dentifrice on brush.
- 4. Give patient his brush; hold curved basin under his mouth while he brushes teeth.
  - 5. Give water to rinse mouth; take toothbrush.
- 6. Remove basin; wipe lips and chin with towel.
  - 7. Make patient comfortable.
  - 8. Remove equipment from unit.



Figure 51.—Assisting Patient With Oral Hygiene.

## When patient is unable to help himself:

- 1. Add drinking tube and tongue depressor to equipment.
  - 2. Proceed as above, doing all steps for patient.

## Brushing teeth:

Start at front teeth, brush from one side of mouth to the other.

Brush outer surfaces of the upper and lower teeth toward the biting edge.

Do inner surfaces of teeth in same manner. Use drinking tube to rinse patient's mouth.

## Special Mouth Care

Patients requiring special mouth care are the unconscious, dying patient, or one who has had surgery, injuries, or sores of the mouth.

Do not use force to clean wounds, to clean around wires, or to remove crusts.

#### **EQUIPMENT:**

Seven cotton applicators

Mouth wash (1:3 solution)

Glass of water

Tube

Hand towel

Curved basin

Tongue depressor wrapped with gauze bandage

Paper wipes

Bag for waste

Mineral oil

One ounce bulb syringe if patient is unable to use tube



Figure 52.—Equipment for Special Mouth Care.

#### PROCEDURE:

- 1. Follow instructions as above. Moisten applicators in mouth wash. Use in the same manner as toothbrush.
- 2. Use new applicator for each section of mouth; discard into bag.



Figure 53.—Mouth Irrigation.

- 3. Use wrapped tongue depressor for cleansing tongue and holding mouth open.
- 4. Use drinking tube to rinse mouth. If patient is unable to use tube and is conscious, turn his head to one side and gently irrigate mouth. Direct stream of solution to side of mouth. If patient is unconscious, use moistened applicators.
  - 5. Apply mineral oil to lips and gums.
- 6. Make patient comfortable, remove equipment.

## Care of Equipment

- 1. Rinse toothbrush under cold running water; replace in patient's bedside table.
  - 2. Discard waste into burnable trash can.
- 3. Wash metalware with soap and water, boil 20 minutes, dry and stow in proper place.
- 4. Wash glassware with soap and water, boil 10 minutes; dry and stow in proper place.

## Charting—Nursing Notes

Time, treatment, any unusual condition noted. Signature.

## Care of Dentures (False Teeth)

#### INDICATED:

Plates and bridges should be cared for as often and in the same manner as natural teeth.

#### EQUIPMENT:

Glass or cup for teeth Toothbrush and dentifrice

#### PROCEDURE:

- 1. Ask patient to place teeth in glass.
- 2. Take to utility room.
- 3. Place basin under tap in sink and place folded towel or washcloth in basin as a precautionary measure against breakage.
- 4. Wash dentures under warm running water over basin.
- 5. Use patient's brush and dentifrice, rinse dentures well.
  - 6. Put teeth in glass; return them to patient.

## Care of Equipment

Same as for Oral Hygiene.



Figure 54.—Cleaning Dentures.

## MORNING CARE (A.M. CARE)

#### PURPOSE:

To refresh and prepare patient for breakfast.

#### INDICATED:

For all bed patients, 1 hour before breakfast, or upon awakening.

#### EQUIPMENT:

Face basin one-half full of hot water Glass of water, curved basin Patient's toothbrush and dentifrice Hand towel, washcloth Soap in soap dish Comb

#### PROCEDURE:

- 1. Offer bedpan or urinal.
- 2. Do oral hygiene.
- 3. Wash face and hands.
- 4. Comb hair.
- 5. Prepare patient for breakfast:
  - a. In correct position (Fowler's or on side).
- b. Clear top of bedside locker or overbed table for food tray.

For Group of Patients.—Use wheeled cart. Load with equipment as above. Add large pitcher of hot water, small pitcher of cold water. Distribute equipment to patients who are able to help themselves, then to patients who require help.

## **EVENING CARE (P.M. CARE)**

#### PURPOSE:

To relax and prepare patient for the night.

#### INDICATED

For all bed and newly convalescent patients.

#### EQUIPMENT:

Same as for A.M. Care, plus alcohol and powder or skin lotion.

#### PROCEDURE:

- 1. Follow instructions as for A.M. Care.
- 2. Add back rub.
- 3. Straighten and tighten foundation bed, brush out crumbs, and freshen pillows.
  - 4. Bring bedside locker within patient's reach.
  - 5. Give fresh drinking water.
- 6. Place extra blanket at foot of bed if night is cool.

#### CLEANSING BATHS

#### PURPOSE:

To clean, relax, and refresh patient; to stimulate circulation, aid in elimination of body wastes; to observe patient.

#### Bed Bath

#### INDICATED:

For new patients on admission and daily for all bed patients, preferably in the morning but may be given at any time which best meets the need of the patient.



Figure 55.—Equipment for Bed Bath.

#### EQUIPMENT:

Bath basin or foot tub one-half full of hot water (110° F.)

Soap in soap dish

Rubbing alcohol, 50 percent, or skin lotion

Talcum powder (do not use after skin lotion)

Nail stick

Nailbrush, if needed

Oral hygiene equipment

Linen as needed: pajamas, bath and hand towels, washcloth

#### Points to remember:

- 1. Use long, firm, smooth strokes in bathing.
- 2. Wash all parts of the body; soak hands and feet.
- 3. Squeeze washcloth sufficiently to avoid dripping water over bedding.

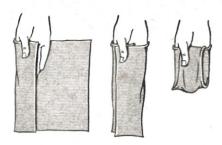


Figure 56.-Mitten Washcloth.

- 4. Wrap washcloth around hand and secure ends with thumb or use mitten washcloth, whichever method permits you to squeeze and secure the ends of the cloth and takes the least time.
  - 5. Expose only that part being bathed.
- 6. Change water after bathing feet and when it becomes dirty, soapy, or cool.
- 7. Observe patient. Watch for signs of rash, scratching, pressure areas, vermin. Talk to patient during bath; find out how he feels. Any new pains? Aches? Worries? Happy?
- 8. Protect bedding with towel as each part is bathed.
- 9. Keep linen off floor. Place soiled linen in hamper.

#### PROCEDURE:

Preparation of patient and his unit is as follows:

- 1. Screen patient, close windows, and check temperature of ward (72° to 75° F.).
  - 2. Tell patient what you are going to do.
  - 3. Offer bedpan and urinal.
- 4. Gather equipment needed except basin; bring to bedside.
  - 5. Do oral hygiene.
- 6. Remove oral hygiene equipment; bring in basin of water.
- 7. Lower backrest; loosen top bedding at foot and sides of bed.
  - 8. Remove pillow; strip and place on chair.
- 9. Fold spread from top to bottom; pick up in center and place on back of chair.
- 10. If ward is warm, blanket may be removed in same way.
- 11. Remove jewelry; place in drawer of bed-side stand.

#### Order of bath:

- 1. Eyes (no soap).
- 2. Face, neck, and ears.
- 3. Far arm, hand, nails.

- 4. Near arm, hand, nails.
- 5. Chest.
- 6. Abdomen.
- 7. Far leg, foot, nails.
- 8. Near leg, foot, nails.
- 9. Back, buttocks: Wash sides, back, buttocks; rinse and dry well.
- a. Pour alcohol into hands; then apply evenly to patient's back. Rub until back is dry.
- b. Sprinkle powder or skin lotion into hands; then apply to patient's back. Rub for 5 minutes. Use long, smooth, firm strokes; even pressure; establish definite rhythm; keep hands on back for duration of back rub.
- 10. Genitals—patient usually prefers to wash himself; corpsman will do so if patient is too ill.



Figure 57.—The Bed Bath. Patient's sheet is turned back to show method of draping.

#### After bath:

- 1. Put on pajamas.
- 2. Comb hair.
- 3. Make up bed. (See Occupied Bed.)
- 4. Remove all equipment; leave unit clean and in order.
  - 5. Leave patient comfortable:
    - a. In correct position.
    - b. Call bell, fresh water, and bedside table within reach.
- 6. Clean equipment. (See Use and Care of Equipment.)

Male patient: Patient may shave himself either with his a.m. care or before his bath. When corps-

man must shave patient, do so before bath or after lunch, before visiting hours.

Female patient: Give patient all her makeup equipment after the bed is finished. She will apply makeup while unit is being straightened.

When patient is able to bathe himself:

- 1. Bring equipment within his reach.
- 2. Assist him as necessary (back, legs, feet).
- 3. Make up bed; straighten unit.

## Tub Bath

## EQUIPMENT:

Warm bathroom (72°-75° F.)

Stool or chair

Bath mat

Pajamas, bathrobe

Bath towel, washcloth

Soap in soap dish

#### PROCEDURE:

- 1. Have bathroom warm without drafts.
- 2. Draw water for bath. Temperature of water should be comfortably warm.
  - 3. Place bath mat on floor in front of tub.
- 4. Assist patient to undress, get into tub, wash and dry himself, to dress and return to his bed.
- 5. Patient may carry out the entire procedure himself if he is able. Do not allow the door of the bathroom to be locked!

CAUTION: Do not have the water too hot or too cold. Do not have the bathroom so hot as to cause chilling when patient returns to ward. Be sure to use proper body mechanics when stooping over to assist patient.

#### Charting—Nursing Notes

Record: time, bath, observations made. Signature.

#### BEDPAN SERVICE

#### PURPOSE:

To maintain proper elimination with least exertion to patient.

#### **EQUIPMENT:**

Bedpan

Bedpan cover

Toilet paper

#### PROCEDURE:

1. Screen unit. Take covered bedpan and toilet paper to bedside. (Bedpan may be warmed by running hot water over it and then drying it.)

- 2. Remove bedpan cover and tuck under mattress on side of the bed.
- 3. Lift bed covers; remove any air cushions and pillows.
- 4. Pull pajama coat above waist and pajama pants down to knees.
- 5. Flex patient's knees, slip one hand under the patient's back, raise his hips, and with the other hand, slip pan into place. Or: Roll patient to side of bed, place the pan against his buttocks, and then roll him back to the center of the bed on the pan.

NOTE: If the patient is heavy or unable to help, ask another to help you. (If patient is able to help himself, ask him to bend his knees, press heels against the bed, and raise his hips while you place the pan.)

- 6. Place toilet paper and bell cord within reach.
- 7. Leave patient alone unless he is too ill.
- 8. Answer light immediately and remove pan quickly.
- 9. For patient unable to cleanse himself: Ask patient to turn on his side off the pan; take toilet paper and clean patient.
  - 10. Cover pan and place it on chair.
- 11. Fix bedding; leave patient in comfortable position.
- 12. Take pan to utility room; look at contents. Note amount, consistency, color, odor, and unusual appearance (mucus, worms):

Normal stool—brown, formed, soft.

Blood in stool-black, tarry.

Absence of bile in stool—clay-colored gray.

13. Provide patient with basin of water, soap and towel to wash his hands.

14. Care of bedpan:

Automatic washer: Place pan in sterilizer, close door, and push flusher valve. Push and hold steam valve for 1 minute. Remove pan and stow in rack or return to patient's unit.

Manual washing: Add cold water to bedpan and empty contents into hopper; clean bedpan with brush and hot soapy water. Boil pan in utensil sterilizer for 20 minutes.

## URINAL SERVICE

#### **EQUIPMENT:**

Urinal and cover

#### PROCEDURE:

- 1. Bring covered urinal to patient.
- 2. Remove urinal promptly.
- 3. Take urinal to utility room; note color, odor,

appearance. Measure amount and record on DD 792 if required.

4. Clean urinal in same manner as bedpan.

## CARE OF INCONTINENT PATIENT

## PURPOSE:

To keep the patient as clean and dry as possible; to prevent decubitus ulcers.

Incontinence may be due to:

Loss of muscle tone or paralysis of the anal or urethral sphincter.

Urinary retention with overflow.

Bedpan or urinal not given when needed.

#### PROCEDURE:

- 1. Answer patient's calls promptly.
- 2. Change bedding at once when wet or soiled.
- 3. Wash patient with soap and water each time he is wet or soiled.
- 4. Watch for signs of burning, redness, or breaks in the skin.
- 5. Give frequent back rubs alternating oil and alcohol.
- 6. Place patient on a bedpan at frequent intervals.
- 7. Place a urinal for a male patient. Be sure it is level and will not tip over. Empty, clean, and replace frequently.
- 8. Use a large disposable pad or covered rubber sheet under the patient's buttocks.
- Doctor may order an indwelling catheter to keep the patient dry. See Indwelling Catheter and Simple Drainage.

## CARE OF BEDSORES

## (Decubitus Ulcer, Pressure Sore)

A bedsore is an ulcerated area due to poor circulation to a part as the result of pressure. The areas most likely to develop bedsores are the elbows, heels, hips, buttocks, ankles, toes, ears, back of the head, and areas over the end of the spine and shoulder blades. All patients confined to bed are susceptible to bedsores. The patients most likely to develop bedsores are those with lowered vitality due to prolonged illness; the emaciated patients; paralyzed patients; unconscious patients; obese patients; the edematous patients; diabetic, cardiac, or nephritic patients; those with casts, splints, bandages, or in traction.

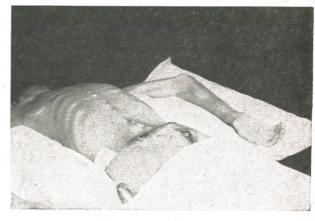


Figure 58.—A Bedsore.

#### Causes

- 1. Constant pressure on an area due to lying in one position too long.
- 2. Splints, casts, bandages, or traction improperly applied.

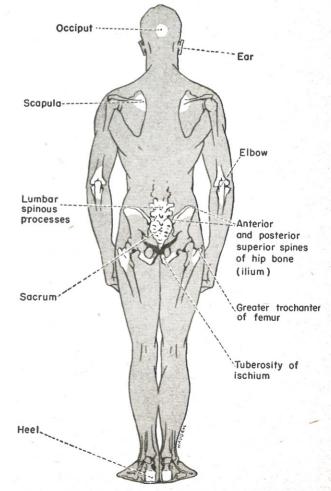


Figure 59.—Areas Susceptible to Bedsores,

- 3. Moisture due to sweat, urine, feces, water, pus, or other discharges.
  - 4. Friction due to too tight or wrinkled bedding.
  - 5. Pimples or breaks in the skin.
  - 6. Faulty use of the bedpan.

#### Symptoms

- 1. Blanching of the skin which quickly turns red when the cause of the pressure is removed.
- 2. Patient complains of numbness, tingling, or tenderness.
  - 3. Bluish or mottled discoloration of the skin.
  - 4. Breakdown of the skin.
  - 5. Ulceration.

## Prevention

- 1. Inspect the skin of all bed patients every day during the bath and morning and evening care.
  - 2. Change the patient's position every 2 hours.
  - 3. Keep patient and his bed clean and dry.
- 4. Rub suspected areas frequently, alternate oil and alcohol rubs.
- 5. Wash, dry and powder patient's skin with talcum or cornstarch each time he is incontinent.
  - 6. Inspect all appliances frequently.

#### Treatment

- 1. Prevent bedsores by following instructions given under Prevention.
  - 2. Report any suspicious areas immediately.
  - 3. If skin is broken:
    - a. Wash with soap and water; dry well.
    - b. Rub the surrounding area with alcohol.
    - c. Follow doctor's orders for other treatment or medication.

#### DIETS AND SERVING PROCEDURES

The patient's appetite is stimulated by the time of day, by the sight, smell, and taste of food and by the manner and condition in which it is served to him. The ward should be quiet, odorless, and in readiness for meals. No treatments should be done, sick calls made, or visitors permitted during meal hours.

#### Standard diets

#### Liquid:

Clear—tea, coffee, broth, gelatines.

Full—add strained soups, juices, ice cream.

Soft—add chicken, beef; bland vegetables, puddings.

Light—add light salads, vegetables, lamb, veal, dessert, plain cake.

Regular—full house diet.

## Special diets

For specific conditions. (See Chapter V.) Certain foods are increased or decreased according to needs of the patient.

## Preparation of the Patient

## Bed patient:

- 1. Clear bedside stand or overbed table.
- 2. Bring stand or table within patient's reach.
- 3. Place patient in sitting position or on his side.
- 4. Tuck a hand towel under his chin and across his chest.

## Ambulatory patient:

Remind patient to be at his bedside when meals are served. Where possible, serve ambulatory patients at a table in solarium.

In many Naval hospitals, the preparation and setting up of food trays for patients has been centralized in the main kitchen. The complete trays are delivered to ward by Central Food Service. The ward personnel usually serve the trays, assuming the responsibility for seeing that each patient receives the correct diet.

When the patients are finished, the trays are collected and returned to the main kitchen where the dishes are washed and sanitized. The following procedures are suggested where Central Food Service is not available.

#### Preparation of Food Trays

- 1. Wash your hands!
- 2. Inspect dishes, silverware, and trays for cleanliness.
  - 3. Use clean serving utensils for serving food.
  - 4. Follow Diet List posted in ward diet kitchen.
- 5. Do not smoke while preparing, setting-up, or serving trays.

#### Setting-up Food Trays

1. Sugar, salt, pepper, and water go on most trays, but follow diet lists!

Diabetic diets—omit sugar.

Low salt—omit salt.

Ulcer—omit salt and pepper.

Restricted fluid—omit salt, pepper, water.

Low fat—omit butter.

2. Place cold foods on tray—bread, butter, salad, dessert, milk. Wheel trays and food cart with serving utensils to center of the ward.

## Serving Trays

Be sure you have the right diet on the right trav for the right person!

- 1. Serve small portions; patient may ask for seconds.
- 2. Place foods in center of dishes; avoid spilling over sides.
- 3. Fill glasses, cups, and bowls to one-half inch from the top.



Figure 60.—Enjoying a Meal.

- 4. Place hot foods on each tray as it is served.
- 5. Cut food into bite size and butter the bread for those patients unable to use knives.
- 6. Place tray in front of patient so that the knife is on right side of the tray and all dishes are within his reach.

## Order of Serving Trays

- Serve bed patients who are able to feed themselves.
  - 2. Serve up patients.
- 3. Hold trays for helpless patients until corpsmen are ready to feed them.

## Collecting Trays

1. Do not hurry your patients! Give them time to enjoy their food.

- 2. Collect trays on utility cart. Take to door of ward diet kitchen.
  - 3. Remove trays one at a time.
  - a. Scrape solids from dishes into garbage can; stack dishes.
  - b. Pour liquids down sink; stack cups and glasses.
    - c. Wipe and stack trays.
  - d. Send trays, dishes, and silverware to Central Dishwashing Service.

#### Dishwashing on Ward

- 1. Machine dishwashers and sanitizers.—Follow instructions posted on machine. Check temperature control. If questionable; immerse dishes and silverware in boiling water for 1 minute, allow to air dry.
- 2. Manual dishwashing and sanitizing.—Rinse dishes and silverware. Wash with hot soapy water. Immerse dishes and silverware in boiling water for 1 minute, allow to air dry.

#### Feeding the Helpless Patient

- 1. Place the patient in a sitting position unless otherwise ordered by the doctor.
- 2. Place a hand towel across the patient's chest; tuck a napkin under his chin.
- 3. Place tray on overbed table or on bedside stand.
- 4. Give the patient a piece of buttered bread if he is able to hold it.
- 5. Feed the patient in the order in which he likes to be fed.



Figure 61.—Feeding a Helpless Patient.

- 6. Offer fluid during the meal. Use a drinking tube.
- 7. Do not rush your patient—give a small amount of food at one time; allow patient to chew and swallow food before offering the next spoonful.
- 8. If patient is inclined to talk, talk with him. It is an excellent time to observe your patient. Find out his likes and dislikes in food, particularly if his appetite is poor or if he is on a special diet.
- 9. When he is finished, lower backrest; fix his bed so that he may rest.
- 10. Take tray to diet kitchen; scrape and stack tray.
- 11. Note amount of food he has eaten; record amount of fluid if on measured intake and output.

## Feeding the Blind Patient

- 1. Follow steps 1, 2, and 3 under Feeding a Helpless Patient.
  - 2. Tell patient what food is on the tray.
  - 3. As you feed him:

Tell him what you are offering him, whether hot or cold, and whether it is in a spoon, cup, or drinking tube.

Allow him to hold a piece of buttered bread if he wishes.

4. If doctor permits, start patient toward helping himself.

#### Always:

Set the tray in the same place in front of him. Place the dishes in the same order on the tray.

Place the same type of food in the same clockwise position on the dinner plate.

Fill cups and glasses only half full to avoid his spilling fluids.

Go slowly—help him by degrees; a little progress each day will help build his confidence. Stand by until he is sure and is confident of himself.

## Feeding an Infant

#### Preparation of Formula

- 1. Wash your hands.
- 2. Obtain the right formula for the right baby from the refrigerator.
- 3. Place the bottle in a pan of water sufficiently hot to heat the formula to about 100° F.

## Feeding the Infant

- 1. Pick up the baby, cradling and supporting his head and back on your arm. Sit down in a straight-backed chair.
- 2. Pick up the bottle of formula; sprinkle a few drops on the inner surface of your wrist to test the temperature of the formula (should be slightly warmer than body temperature).
- 3. Place nipple in the baby's mouth. Be sure the neck of the bottle is always filled with formula.
  - 4. Note the rate of flow of the formula.

A flow too rapid may cause the baby to choke or to lose the formula and may be due to the nipple being too soft and old or nipple holes being too large. Replace nipple.

A flow too slow may cause the baby to work too hard to get the formula and may be due to the nipple holes being too small or clogged. Replace nipple. When due to an air lock, stop feeding and hold bottle upright for a second and then continue feeding, being sure the neck of the bottle is always filled with formula.



Figure 62.—Feeding an Infant.

## References and Suggested Additional Reading— Unit II

American Red Cross: *Home Nursing*. Philadelphia, Blakiston Co., 1950.

Dakin, F., Thompson, E. and LeBaron, M.: Simplified Nursing. 6th ed. Philadelphia, J. B. Lippincott Co., 1956.

Fash, B.: Kinesiology in Nursing. New York, McGraw Hill Book Co., 1952.

Harmer, B. and Henderson, V.: Textbook of Principles and Practices of Nursing. 5th ed. New York, Macmillan Co., 1955. Part II.

Rapier, D. K., Koch, M. J., Moran, L. P., Fleming, V. L., Cody, E. L. and Jensen, D. (Ed): *Practical Nursing*. St. Louis, C. V. Mosby Co., 1958. Unit IV, Part I.

Smith, C. R.: Alcohol as a Disinfectant Against

Tubercle Bacilli, in *Public Health Reports* 62:36, pp. 1285–1295, Sept 1948. Abstract: *Bureau Medicine and Surgery Newsletter* 10:8, Feb 1948.

Thompson, L. R.: *Microbiology and Epidemiology*. 4th ed. Philadelphia, W. B. Saunders Co., 1958. Part I.

Young, H., Lee, E. and Associates: *Essentials of Nursing*. 3d ed. New York, G. P. Putnam's Sons, 1953. Part II, sec 4–13.

McClain, E. and Gragg, S.: Scientific Principles in Nursing. 3d ed. St. Louis, C. V. Mosby Co., 1958. Units I, II, IV.

Check current issues of periodicals for information on care and comfort of patient. Periodicals available at most stations are:

Armed Forces Medical Journal American Journal of Nursing

# ASSISTING WITH AND PERFORMING DIAGNOSTIC AND THERAPEUTIC PROCEDURES—UNIT III

Diagnostic and therapeutic procedures have so greatly increased in number, scope, and complexity, that the corpsman may find himself spending the greater portion of his time on duty assisting with or performing these procedures.

In order to intelligently assist with or perform these procedures the corpsman should know:

- 1. How and why the procedure is done.
- 2. What care the patient should have before, during, and after the procedure.
- 3. What role he takes in the procedure; what part the doctor or technician assumes.
- 4. What equipment is necessary for the procedure; whether the equipment should be clean or sterile.
- 5. The time of the day the procedure may be performed to obtain the best results.
  - 6. What symptoms and reactions are expected

as a result of the procedure. What symptoms or signs of untoward reactions may occur.

When assisting with or performing these procedures, always strive to keep in mind that each one has been ordered by the doctor for a patient. The benefit the patient will derive from the procedure will depend to a considerable degree upon your ability to explain the procedure sufficiently to him so that he understands what is to be done, why the procedure has been ordered, and how he may help to assure the success of the procedure.

Diagnostic tests and examinations are presented in table form for quick and ready reference. All tests listed should be checked with local station orders since methods vary in different localities. The tables are preceded by general instructions for the preparation of the patient, collection of specimens, and for charting notes.

Therapeutic procedures are discussed in subsequent sections.

## DIAGNOSTIC TESTS AND EXAMINATIONS

Review—Local Station Instructions

Chapter II, Section Pertaining to the Anatomy or Physiology of the Part of the Body To Be Examined

Chapter X, Section Pertaining to the Desired Test or Examination

### GENERAL INSTRUCTIONS

## Preparation of the Patient

Explain the test or examination to the patient.

Show the patient how to cooperate to make a successful test or examination.

Provide transportation (wheel chair, stretcher) when test or examination is performed in another ward or department.

## Care of the Patient After Test

Relieve pain if present.

Heat and serve food if meal has been withheld. Give bath or a.m. care if either have been omitted.

### Charting-Nursing Notes

1. Specimens:

Time of collection.

Type of specimen.

Name of test ordered.

Amount of specimen in cc. if measurable.

Any other item affecting the result of the test.

Example: 1000: Bromsulfalein 25 mg. I.V. given by Dr. Jones. 1030: blood specimen taken.

2. Special tests or examinations:

Time of the test.

Name of the test.

By whom the test was performed.

Name of the doctor doing the test if done on the ward.

Amount and descripton of fluid obtained if applicable.

Special preparation of the patient for the test.

Reaction of the patient to the test.

Example: 1000: Lumbar puncture by Dr. Jones. 5 cc. clear, colorless spinal fluid obtained. Manometer pressure 150 mm. Patient placed in prone position. Patient cautioned to remain flat in bed. 1030: Complains of headache.

## Collection of Specimens

Observe the nine "rights" for collecting specimens. Be sure that—

- 1. The right specimen, from
- 2. The right patient, collected in
- 3. The right manner, at
- 4. The right time, into

- 5. The right container, in
- 6. The right amount, and with
- 7. The right label, is taken to
- 8. The right place in the laboratory, and handed
- 9. The right person.

## CAUTION: When collecting specimens:

- 1. Wash your hands before and after touching specimens and containers.
- 2. Keep the outside of the container clean to protect other personnel handling specimen.
- 3. Attach request for examination to the specimen container with a rubber band, string or clip. Exception: Keep request separate when specimen is from a patient with a communicable disease. Place specimen container inside a clean paper bag and clip request to clean side of bag.
- 4. Do not send specimens to the laboratory that have been spoiled by cigarette butts, matches, tissues or other debris.

## Table I.—Collection of Specimens <sup>1</sup>

CHECK LOCAL STATION INSTRUCTIONS

Specimen or test	Equipment	Method of collection	Duty of ward corpsman	Normal values
SECRETION OR EXCRETION A. Urine: 1. Single: a. Clean.	Urinal or bedpan. Specimen bottle with cap. Rubber band. Request Form 514-A.	Patient voids into clean urinal or bedpan. Sample 120–150 ec. is poured into specimen bottle, capped. Request is wrapped around bottle, held in place by rubber band.	Make out request, collect specimen, send specimen to laboratory. Receive and staple report to Form 514.	Reaction—acid. Specific gravity: 1.012 to 1.024. Albumin: Negative. Sugar: Negative. Acetone: Negative. Microscopic: Blood: Negative. Pus: Negative. Pus: Negative. Bacteria: Negative. Epithelial cells: Few.
b. Sterile.	Catheterization tray. Sterile specimen bottle. Sterile 4 x 4 (2). Rubber bands (2). Request SF 514-A.	Female. Patient is catheterized; urine is collected directly into sterile bottle. Sterile 4 x 4s are placed over top of bottle and secured by rubber band.  Male. Voided specimen taken after first thoroughly cleansing meatus and discarding first ounce of urine is usually satisfactory. Specimen is collected in sterile specimen bottle and covered with 4 x 4s.	Same as 1.	Same as 1.
c. Culture.	Catheterization tray. Sterile culture tube. Request SF 514-K.	Female. Same as 1b except urine is collected directly into a culture tube.  Male. Same as 1b except that specimen is collected directly into a culture tube.	Same as 1.	Negative.
2. 24-hour (quantitative).	Urinal or bedpan. Gallon bottle (from laboratory). Shipping tag. Request SF 514-A.	Shipping tag is made out with patient's name, rate, date, type of specimen; tied to gallon bottle.  All urine voided is placed in gallon bottle.	Instruct patient. Collect specimen for 24 hours (0700-0700), continue as in 1. Send entire specimen to laboratory.	Quantity: 1,000 to 1,800 cc. in 24 hours. Specific gravity: 1012 to 1024. Sugar: Negative. Albumin: Negative. Bacteria: Negative.

i Sources: Naval Medical School: Instructions for Requesting Laboratory Services. Bethesda (NNMC), 1957. Muller, G. and Dawes, D. E.: Introduction to Medical Science. 4th ed. Philadelphia, W. B. Saunders Co., 1958. McClain, E.: Scientific Principles in Nursing. St. Louis, C. V. Mosby Co., 1950.

## Table I.—Collection of Specimens—Continued

CHECK LOCAL STATION INSTRUCTIONS

Specimen or test	Equipment	Method of collection	Duty of ward corpsman	Normal values
SECRETION OR EXCRETION—con.			1	
A. Urine—Continued 3. Phenoisulfonphthalein test (PSP).	Ampule PSP. Sterile syringe. Intramuscular needle. Alcohol sponges. Water 400 cc. Two specimen bottles with labels. Request SF 514-L.	Patient drinks 400 cc. Voids. Immediately after voiding, patient is given 1 cc. PSP intramuscularly or intravenously. Urine is collected 1 hour and 10 minutes after injection; second specimen 2 hours and 10 minutes after injec- tion.	Instruct patient. Obtain equipment. Inject PSP intramuscularly or assist doctor with intravenous. Collect specimens at times specified. Fill out requests, indicating first and second specimen and time collected. Take specimens to laboratory.	40-50 percent of dye i eliminated in the firs specimen. 60-75 percent is eliminated at completion of test.
4. Benedict's test for sugar (usually done on ward).	Bedpan or urinal. Benedict's solution. Alcohol lamp. Medicine dropper. Test tube and holder. Matches.	Collect in same manner as for single specimen 20 to 30 minutes before meals or as ordered by doctor. Place 5 cc. Benedict's solution in test tube. Add 8 drops of urine to solution. Light alcohol lamp. Boil solution for 1 minute. Note reaction— Blue, clear, no change in color: Negative. Cloudy, slight change in color, green: 1 plus. Cloudy, yellow green: 2 plus. Cloudy, yellow brownred: 3 plus. Cloudy, orange, brick red: 4 plus.	May do the entire test or send specimen to labora- tory with request as in 1. Check "sugar" on SF 514-A.	Negative.
5. Clinitest. Reagent test for sugar (usually done on ward).	Clinitest reagent tablets No. 2102. Bedpan or urinal. Test tube. Medicine dropper. Clinitest color chart.	Collect as for single specimen 20-30 minutes before meals or as ordered by doctor. Place 5 drops of urine in test tube. Rimse dropper then add water to the test tube. Drop 1 clinitest tablet into tube, watch solution boil. Wait 15 seconds after boiling stops, then shake tube gently. Hold tube next to color chart and compare. All shades of blue: Negative. More than 2 percent causes rapid change to green, olive tan, orange, brown: Positive.	May do the entire test. Report and record result.	Negative.
6. Acetest reagent test for acetone.	Bedpan or urinal. Medicine dropper. Acetest reagent tablets. Paper towels.	Collect as for single specimen. Place paper towel on table. Place tablet on towel. Place 1 drop of urine on tablet, wait 30 seconds, watch color. After 30 seconds, no change in color or cream shade due to wetting: Negative. Lavender to deep purple: Positive.	May do entire test. Report and record result.	Negative.
B. Feces: 1. Ova and parasites.	Clean bedpan. Screw-cap bottle. Two tongue blades. Request SF 514-G.	Time: Early a.m. before 0800. Collect specimen in clean bedpan. Take bedpan to utility room. With tongue blades, remove feecs (at least size of walnut) from pan; place in bottle. Screw cap on tightly.	port to SF 514.	Negative.
2. Occult blood.	Same as B1, add: Meat-free diet.	Same as B1. Patient is placed on a meat-free diet at least 2 days before specimen is collected.	Same as B1.	Negative.
3. Ameba.	Same as B1, add: Basin of warm water.	Same as B1. Place bottle in basin of warm water.	Same as B1. Send immediately to laboratory in warm water bath.	Negative.
4. Intestinal bacteria: a. Rectal swab (pre- ferred method).	Soap and water for cleansing perianal skin. Two sterile cotton swabs. Sterile test tube. Sterile broth or saline. Request SF 514-K.	Doctor collects specimen. After perianal area is cleansed, the sterile swab is moistened with sterile broth. The swab is inserted into the anus beyond the sphincter. Specimen is procured by swabbing wall of rectum.	immediately. Receive report, staple to SF 514.	Escherichia coli. Aerobacter aerogenes.

## Table I.—Collection of Specimens—Continued

CHECK LOCAL STATION INSTRUCTIONS

Specimen or test	Equipment	Method of collection	Duty of ward corpsman	Normal values
SECRETION OR EXCRETION—con.  B. Feces—continued b. Culture.	Sterile bedpan.	Collect angelmen in at 11	Collect analysis at the	For the state of t
b. Culture.	Sterile bedpan. Sterile screw-cap bottle. Sterile tongue blades. Request SF 514-K.	Collect specimen in sterile bedpan. With sterile tongue blades, place small portion of feces in sterile bottle. Screw cap on tightly.	Collect specimen, observing aseptic technique through out procedure. Take specimen to laboratory immediately, call to technician's attention.	Escherichia coli. Aerobacter aerogenes.
C. Sputum: 1. Single.	Wide mouth screw-cap bottle/ jar. (60 cc.) Request SF 514-K.	Time: Early a.m. before breakfast. Patient rinses mouth; coughs deeply and expectorates directly into jar. Specimen must be sputum, not saliva.	Instruct patient. Collect and send specimen to lab- oratory immediately. Receive report. Staple to SF 514.	Usually taken when tuber culosis is suspected. Neg ative for AFB.
2. 24 hour.	Wide mouth screw-cap bottle/ jar. (500 cc.) Request SF 514-K.	Start and stop at definite time (0600–0600). All sputum is expectorated by the patient directly into the bottle. Keep the bottle covered.	Same as C1.	Same as C1.
D. Gastric contents:  1. Gastric wash (fasting specimen).	Levin tube in basin of cracked ice or cold water. Lubricant (may be water, saline, mineral oil, or lubricating jelly). Rubber sheet and cover. Curved basin. Sterile: 20 cc. syringe, specimen tube, normal saline solution. Request Form 514-K.	Time: Early a.m. before breakfast. Levin tube is passed into stomach. Syringe is attached to tube. Specimen is withdrawn and placed in specimen tube. If fluid cannot be aspirated: 15 cc. saline solution is injected through tube, specimen withdrawn and placed in specimen withdrawn and placed in specimen tube.	Explain to patient. Place patient in sitting position. Place covered rubber sheet over chest. Assist doctor. Send specimen with request to laboratory immediately. Receive report, staple to Form 514. NOTE: If specimen is to be collected by ward corpsman: See: Gastrie intubation. Follow instructions in "Method of Collection" column. Where gastric washes are repeated frequently patient may be taught to pass tube. (On doctor's orders.)	Usually taken when tuber culosis is suspected. Normal: Negative for AFB.
Gastric analysis, single fasting specimen.	Levin tube in basin of cracked ice or cold-water. Lubricant (may be water, saline solution, mineral oil, or lubricating jelly). Clean test tube. Rubber sheet and cover. Curved basin. Request form 514–F.	Same as D 1. Omit introduction of saline.	Same as D 1.	Fasting specimen. Total acidity: 15° to 45°. Free hydrochloric acid 5° to 30°.
3. Fractional gastric analysis. a. Alcohol test meal.	Same as D 2. Add 6 test tubes in rack from laboratory. 50 cc. syringe. Label tubes "fasting," Nos. 1, 2, 3, 4, 5. 50 cc. of 7% alcohol.	Fasting specimen collected as in D 1. 50 cc. 7 percent alcohol is introduced through tube. Samples of gastric contents are withdrawn at stated intervals.	Same as D 1 for fasting specimen. Inject 50 cc. 7 percent alcohol through tube. Collect 15 cc. samples. First, 15 minutes after alcohol. Second, 30 minutes after alcohol. Third, 1 hour after alcohol. Fourth, 1½ hours after alcohol. Fifth, 2 hours after alcohol. Be sure each specimen is labeled correctly. Take rack of specimens and request to laboratory. Receive report, staple to Form 514.	Fasting specimen as above. 1 hour after alcohol. Free HCl 20°. Total acidity 30° to 80°.
b. Histamine: This test does not always follow the alcohol test meal. The doctor writes a specific order for histamine to be used.	Same as above. Histamine as ordered. Hypo syringe and needle. On hand: Syringe containing adrenalin 0.5 cc.	Histamine is given subcutaneously 30 minutes after alcohol has been injected through tube. Samples of gastric contents are withdrawn at stated intervals.	Collect specimens 15 minutes after histamine and 30 minutes after histamine. Label specimens with time and Following Histamine." Take specimens to laboratory. Receive report, staple to form 514. Watch for reaction to histamine. Toxic reactions: Urticaria, headache, sweating, drowsiness, dizziness, severe dyspnea. Antidote: Adrenalin.	30 minutes after histamine; free hydrochloric acid $40^{\circ}$ to $140^{\circ}$ .

## Table I.—Collection of Specimens—Continued Check Local Station Instructions

Specimen or test	Equipment	Method of collection	Duty of ward corpsman	Normal values
SECRETION OR EXCRETION—con.  E. Discharae from wounds or			and or made companient	rotmat values
cavities: 1. Smear.	Sterile slides. Sterile applicator. 2 rubber bands. Request Form 514-K.	Open package of slides; wrap rubber band around the end of 1 slide. With sterile applicator take sample of discharge. Spread discharge lightly in center of slide. Repeat for second slide. Place both slides together, smeared sides inside. Fasten slides together with rubber band. Take to laboratory with request immediately.	Make out request. Take smear or assist technician. Receive report, staple to Form 514.	Negative for organisms.
2. Culture.	Sterile applicators in test tube. For throat cultures obtain special tube with special media from laboratory. Request SF 514-K.	Remove cotton from tube, hold between second and third finger. Remove applicator without touching tube. With applicator take sample of discharge. Replace applicator in tube up to where it was held by the fingers. Replace cotton in tube. Take to laboratory with request immediately.	Make out request. Take culture or assist technician. Receive report, staple to Form 514.	Negative for growth.
F. Blood:  1. Blood count:  Red blood count (RBC).  White blood count (WBC).  Differential (DIFF).  Hemoglobin (HGB).	Request Form 514-B, Equipment brought by lab- oratory technician.	Skin puncture, usually finger.	Send request to laboratory. Assist technician if necessary. Receive report, staple to form 514.	RBC. 4,500,000 to 5,000,000 per cubic millimeter. WBC. 5,000 to 9,000 per cubic millimeter. Differential: Neutrophils, 66 percent. Lymphocytes, 26 percent. Monocytes, 6 percent. Eosinophils, 2 percent. Basophils, 0.5 percent.
2. Coagulation time. Bleeding time.	Same as F1.	Same as F1.	Same as F1.	Coagulation 3 to 7 min. (Sabroze). Bleeding 3 to 6 min. (Duke).
3. Hematocrit.	Same as F1.	Same as F1.	Same as F1.	Male: 47 cc. per 100 cc. Female: 42 cc. per 100 cc.
4. Sedimentation rate.	Same as F1. May be done by ward corpsman. 10 cc. syringe. 19-gage needle. Tourniquet. Alcohol sponge. Cutler tube. Sodium citrate.	Pour sodium citrate up to first calibration on Cutler tube. Withdraw 4 ec. blood by venipuncture. Mix blood and citrate. Place tube in upright position. Observe tube every 5 minutes for 1 hour.  Note the calibration on tube as blood separates.	May be responsible for complete test. Record observations, record calibrations on tube.	Cutler method: Males: 8 mm. per hour. Females: 12 mm. per hour.
5. Serological tests: Was- sermann, Kahn, Kline, Widal, other.	Request form 514-C. Equipment brought by laboratory technician.	Venipuncture: 5 cc. blood is withdrawn by laboratory technician.	Send request. Assist laboratory technician if necessary. Receive report, staple to Form 514.	Negative.
6. Chemistries: Nonprotein introgen (NPN), urea nitrogen, glucose, uric acid, total cholesterol, cholesterol ester, total protein, albumin, globulin, ehlorides as NaCl, CO <sub>2</sub> volume percent, calcium, inorganic phosphorus, acid phosphatase, creatinine, drug levels.	Request 514-D. Equipment brought by laboratory technician. "No breakfast" sign for patient's bed.	Venipuncture: Specimen taken by laboratory technician.	Send request. Place "No breakfast" sign on bed night before test. Withhold breakfast until after blood is drawn, instruct patient. Receive report, staple to Form 514. After blood is taken, heat and serve breakfast to patient.	

## Table I.—Collection of Specimens—Continued

#### CHECK LOCAL STATION INSTRUCTIONS

Specimen or test	Equipment	Method of collection	Duty of ward corpsman	Normal values
SECRETION OR EXCRETION—con.  F. Blood—continued 7. Cultures.	Request Form 514-K. Equipment brought by labo- ratory technicians.	Venipuncture: Specimen is taken under strict aseptic technique by laboratory technicians or doctor.	Same as F1.	Negative.
8. Typing.	Request Form 514-N.	Same as for F6.	Same as F1.	A, B, O, Rh neg. or pos.

## Table II.—Special Tests and Examinations <sup>1</sup>

Diagnostic test	Equipment	Method of collection	Duty of ward corpsman	
A. Body fluids:  1. Lumbar puncture (spinal fluid).	From CDR: Sterile lumbar puncture tray. Rubber gloves. Water manometer. Procaine, ½ to 1 percent. From ward: Alcohol sponges. Curved basin. Cup or jar to hold specimens. Labels for test tubes. Skin disinfectant. Chair for doctor. Forms 514-H, 514-K; list all tests ordered by doctor.	Position of patient: Patient is turned on side near edge of bed, legs flexed on abdomen, head on chest, shoulders and hips in same vertical plane.  Method: Doctor paints area with skin disinfectant, anesthetizes lumbosacral area, inserts needle into spinal canal, measures the pressure with manometer, collects specimens in test tubes.  Normal values  Appearance: Clear, colorless. Reaction: Alkaline. Specific gravity: 1.001 to 1.010. Cell count: 0 to 5. Pressure: 70 to 160 mm. water. Bacteria: Negative.	Tell patient what is to be done. Place and support patient in proper position. Assist doctor. Watch condition of patient (color, pulse, respiration). Receive and label specimens. After treatment:	
2. Paracentesis (abdominal fluid).	From CDR: Sterile paracentesis tray. Rubber gloves. Procaine, ½ to 1 percent. From ward: Large rubber sheet and cover. 3- to 5-gallon pail. Technique forceps. Alcohol sponges. Skin disinfectant. Curved basin. Chair for doctor. Stool, extra pillow for patient. Form 514-M (if specimen is to be collected).	Position of patient: Patient is placed in a chair or on side of bed with feet supported by stool, back supported by pillows.  Method: Doctor paints and anesthetizes abdominal area, makes incision, inserts trocar, takes specimen, connects tubing to trocar, fluid drains into pail.	Assemble and set up equipment. Tell patient what is to be done. Place and support patient in proper position. Drape covered rubber sheet over patient's knees. Assist doctor. Watch condition of patient (his color, pulse, respiration). After treatment: Allow patient to rest. Measure fluid. Send specimen to laboratory if ordered. Receive report, staple to Form 514; call to doctor's attention. Chart treatment.	
3. Thoracentesis (pleural fluid).	From CDR: Sterile thoracentesis tray. Rubber gloves. Procaine, ½ to 1 percent. From ward: Technique forceps. Alcohol sponges. Skin disinfectant. Chair for doctor. Stool, extra pillows for patient. Small rubber sheet and cover. Curved basin. Form 514-M for specimen.	Position of patient: Sitting on side of bed, feet supported by stool, back supported by pillows, or turned on side, with backrest elevated 60°.  Method: Doctor paints and anesthetizes area, inserts needle, attaches syringe, aspirates fluid, collects specimen.	Assemble and set up equipment. Tell patient what is to be done. Place and support patient in proper position. Protect bed with covered rubber sheet. Assist doctor. Keep count of amount of fluid as it is withdrawn. Watch condition of patient (his color, pulse, dyspnea). After treatment: Allow patient to rest. Send specimen to laboratory. Measure fluid. Chart treatment. Receive report, staple to Form 514, call to doctor's attention.	

<sup>&</sup>lt;sup>1</sup> Sources: Naval Medical School: Instructions for Requesting Laboratory Services. Bethesda (NNMC), 1957. Muller, G. and Dawes, D. E.: Introduction to Medical Science. 4th ed. Philadelphia, W. B. Saunders Co., 1958.

## Table II.—Special Tests and Examinations—Continued

7.6			
Diagnostic test	Equipment	Method of collection	Duty of ward corpsman
4. Aspiration of fluid from joints.	From CDR: Sterile aspirating set. Rubber gloves. Procaine, ½ to 1 percent. From ward: Techniques forceps. Alcohol sponges. Small rubber sheet with cover. Curved basin. Skin disinfectant. Forms514-K, 514-M for specimen.	Position of patient: Most comfortable, support joint to be aspirated. Method: Doctor paints and anesthetizes the area, inserts needle, withdraws fluid, collects specimen.	Assemble and set up equipment. Support joint to be aspirated. Tell patient what is to be done. Protect bed by covered rubber sheet under joint to be aspirated. Assist doctor. After treatment: Make patient comfortable. Provide support for joint. Give hypnotic if ordered and necessary. Take specimen to laboratory. Chart treatment. Receive report, staple to Form 514. Call to doctor's attention.
B. Basal metabolism rate (BMR).	Special BMR room or on ward in a quiet room or screened area.  Request Form 514m.  "No breakfast" sign for patient's bed.	Test is taken by technician. Patient lies quietly in bed, breathes through BMR apparatus. Respirations are recorded on graph.	Take height, weight, age, record on request form. Send request to BMR room. Make appointment. Tell patient to remain in bed until after test in a.m. and to take nothing by mouth after 2400. Delay a.m. care and breakfast until after test. Provide transportation to BMR room. After treatment: Heat and serve breakfast. Receive report, staple to Form 514. Chart test.
C. Endoscopies:  1. Cystocopy (follow same procedure for I.V. Pyelogram).	Cheek doctor's orders. For preparation of patient: Enema tray. Hypnotic if ordered. "No breakfast" sign for patient's bed.	Examination is done in cystocopy room.  Cystocope is inserted into urinary bladder, ureteral catheter into fundus of kidney. Dye is given I.V.  Pictures are taken.	Send request, make appointment. Preparation of patient:  1. Cleansing enema night before examination.  2. Give cathartic if ordered.  3. Omit breakfast on day of examination.  4. Give hypnotic if ordered.  5. Provide transportation (stretcher).  6. Send chart with patient.  After treatment:  1. Heat and serve breakfast.  2. Force fluids.  3. Be alert for signs of pain or discomfort.
2. Bronchoscopy.	For preparation of patient: Nothing by mouth. Hypnotic if ordered. "Nothing by mouth" sign for patient's bed.	Examinaton is done in bronchoscopy room. Bronchoscope is inserted into trachea and large bronchi. Mucous membrane is visualized.	Send request, make appointment. Preparation of patient:  1. Nothing by mouth 4 to 6 hours before examination.  2. Give hypnotic if ordered.  3. Provide transportation (stretcher).  4. Send chart with patient. After treatment:  1. After anesthetic has worn off, heat food and serve to patient.  2. Be alert for signs of pain or discomfort.
3. Proctoscopy (follow this same procedure for sigmoid-oscopy).	Check doctor's orders. For preparation of patient: Enema tray. Hypnotic if ordered. "No breakfast" sign for bed. Light supper.	Examination is done in the proctoscopy room.  Proctoscope is inserted into rectum, mucous membrane is visualized.	Send request, make appointment. Preparation of patient: A. Evening before examination: 1. Light supper. 2. Cleansing enema. B. Morning of examination: 1. Cleansing enema until returns are clear. 2. Omit breakfast. 3. Give hypnotic if ordered. 4. Provide transportation (stretcher). 5. Send chart with patient. After treatment: 1. Heat and serve breakfast. 2. Be alert for signs of pain or discomfort.

## Table II.—Special Tests and Examinations—Continued

Diagnostic test	Equipment	Method of collection	Duty of ward corpsman
). X-rays: 1. Bones.	Check doctor's orders, Request Form 519-A.	By X-ray machine in X-ray department.	Take height, weight; record on request. Send request to X-ray. Provide transportation if needed. Receive report, staple to Form 519.
2. Chest: Routine.	Same as D 1.	Patient stands against machine, holds breath, picture is taken.	Same as D 1.  Be sure female patients are in cotton pajamas.
3. Portable.	Write "Portable" at top of Form 519-A.	Taken on ward by portable machine.	Send request. Assist technician as necessary. Receive report, staple to Form 519.
Gallbladder series (GB series) cholecystogram.	Request Form 519-A.  "No breakfast" sign for patient's bed. Fat-free supper evening before X-rays. Gallbladder dye from X-ray.	X-ray is taken by X-ray department. Fatty meal given (usually by X-ray department). Another X-ray is taken.	<ol> <li>Fill out request, add height, weight, age.</li> <li>Make appointment.</li> <li>Order fat-free supper from diet kitchen.</li> <li>Instruct patient—         <ul> <li>A. To rest as much as possible during afternoon before examination.</li> <li>B. To eat or drink only fat-free foods or fluids.</li> </ul> </li> <li>Prepare patient:         <ul> <li>A. Evening before—</li></ul></li></ol>
5. Gastrointestinal series (G.I. series): a. Upper.	Request Form 519-A. "Nothing by mouth" sign for patient's bed.	In X-ray department: Barium is given by mouth.	Fill out request, add height, weight, age.     Make appointment.     Instruct patient to take nothing by mouth after 2400 and until told by X-ray department.     Provide transportation.     Receive report, staple to Form 519.
b. Lower (Barium enema).	Request Form 519-A. Enema tray.	In X-ray department: Barium enema is given, intestinal tract is visualized.	Fill out request and make appointment as in D5a.     Prepare patient:         A. Cleansing enema evening before and morning of examination.         B. May have light breakfast of coffee and toast.         Provide transportation.         Receive report, staple to Form 519.         After examination (5a and 5b):         I Give food when instructed by X-ray department.         Patient may need enema to remove barium (doctor's order).
E. Electrical impulses: 1. Electrocardiogram (EKG).	Special EKG room or bed in ward. Request Form 520.	Patient lies quietly in bed. Leads are fastened to various parts of body. Electrical impulses are recorded on graph.	Take height, weight, age; record on request. Send request, make appointment. On ward: Tell patient to remain quiet. Fold top covers to foot of bed. Loosen pajama coat. Assist technician if necessary. In EKG room: Provide transportation to room.
2. Electroencephalogram (EECG).	Special EECG room. Request Form.	Leads are fastened to various parts of head. Electrical impulses are recorded on graph.	Send request to EECG room, make appointment. Provide transportation. Receive report, place on chart.

## ADMINISTRATION OF MEDICINES

Review——Chapter VII, Chapter VIII

## BUMED INSTRUCTION 6010.3A

Medicines are usually ordered by the doctor for one or all of the following reasons:

- 1. To promote the patient's health (example: vitamins).
- 2. To cure the patient's disease (example: antibiotics).
- 3. To relieve patient's pain or discomfort (example: narcotics).

The administration of medicines is one of the most responsible duties of the corpsman. In the administration of medicines the corpsman is expected to:

- 1. Carry out the doctor's order accurately, giving the right dose of the right medicine to the right patient at the right time and in the right way.
- 2. To observe, record, and report the effects of the medicine on the patient.

# SUGGESTED ROUTINE FOR ADMINISTRATION OF MEDICATIONS AND TREATMENTS

## PURPOSE:

To provide an orderly, safe and economical method of administering medications and treatments.

#### **EQUIPMENT:**

Medication and treatment board Medication and treatment cards

The board provides a visible file for all medications and treatments to be given over a 24-hour period. This board may be placed on the inside door of the supply closet next to the medicine locker, in the space between the upper and lower cabinets of the locker, or on the wall to the side of the medicine locker. The board may be made to fit the spaces available. All boards should provide:

- 1. Space for 25 hooks. One for each hour and p.r.n. (whenever necessary).
- 2. Space between hooks sufficient to allow use of 1¾- by 3-inch cards.
  - 3. Instruction on the use of board and cards.

## Medication and Treatment Cards

- 1. Use NAVMED 1373 for regularly recurring orders.
- 2. Use NAVMED 1374 for p.r.n. orders. Specify frequency at which dose or treatment may be safely repeated.

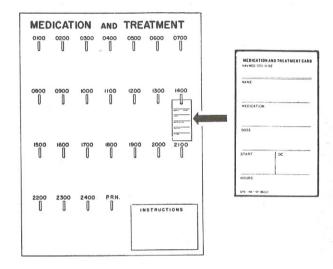


Figure 63.—Medication and Treatment Board and Card.

Cards should include all necessary information—patient's name, bed number, medication or treatment, hours to be given, discontinuation date if one is specified.

Cards must be checked with Doctor's Order Sheets (SF 508) and Nursing Care Plans (NAV-MED 1350) at least twice daily—new cards made out for new orders, cards destroyed for discontinued orders. (New order for narcotics should be obtained from the doctor after 48 hours.)

### Use of board and cards:

- 1. Card is placed on the hook corresponding to the hour the medication or treatment is due.
- 2. When due, the card is removed, medication or treatment is given, and the card placed on the hook for the hour when it is next due.
- 3. The medication or treatment is checked off in the Nursing Notes of the patient's chart.

- 4. Card of p.r.n. order is placed on hook corresponding to the hour at which it may be safely repeated. Before repeating order, patient and his chart are checked. If order is not needed, the card is moved to the p.r.n. hook.
- 5. Card of daily order is placed face down on same hook after it has been given.

## Rules for Administration of Medication

- 1. Do have order for medicine signed by the doctor.
- 2. Do check patient and his chart before giving each dose of p.r.n. medicine.
- 3. Do know how to give the drug in the manner prescribed by the doctor.
- 4. Do wash your hands before preparing the medicine.
- 5. Do measure all dosages at eye level, whether in a glass or syringe.
- 6. Do prepare the medicine you give and give the medicine you prepare.
- 7. Do have a good light when preparing medicine.
  - 8. Do concentrate.
- 9. Do know how drugs act; whether a local or systemic effect is desired and what possible bad effects might occur.
- 10. Do know the minimal, average, and maximal dosage of the drugs you give.
- 11. Do read the label at least three times when preparing a medicine
  - a. When removing it from shelf or drawer.
  - b. After pouring or preparing it.
  - c. When returning it to the shelf or drawer.
- 12. Do give minims when minims are ordered, drops when drops are ordered.
- 13. Do use surgical aseptic technique in preparing injections and when indicated for instillations and irrigations.
- 14. Do chart medications after you have given them. Include name, amount, and time.

#### Do not:

- 1. Do not give a medicine without an order.
- 2. Do not allow interruptions while preparing medications.
- 3. Do not give when doubt exists concerning the patient, the drug or the dose. Consult your doctor or nurse in charge of the ward.
- 4. Do not use a medicine from an unmarked or poorly labeled bottle or container.

5. Do not return excess medicine to the stock bottle or box; discard into sink.

## MEDICATION BY MOUTH

### ADMINISTRATION:

- 1. Acids and irons are given well diluted through a drinking tube.
- 2. Irons, iodides, and arsenic preparations are usually given after meals.
- 3. Cough medicines are given last, undiluted; instruct patient not to drink any fluids for at least 15 minutes afterward.
  - 4. Shake liquids well before pouring.
- 5. Dilute liquids with ½ ounce of water unless contraindicated.
- 6. Give saline medications for edema in small amounts of water; saline cathartics in large amounts of water.
- 7. Make disagreeable medicines as palatable as possible.
  - a. Castor oil mixed with orange juice and 15 grains sodium bicarbonate.
  - b. Add small amount of lemon juice to saline cathartics.
  - c. Chill mineral oil, follow with slice of orange.
- 8. For young children or elderly patients, crush pill or tablet and dissolve in small amount of water; use teaspoon instead of medicine glass.

## EQUIPMENT:

Metal tray with—

Medicine glasses for liquids

Souffle or paper cup for pills or tablets

Stirring rod

Medicine cards

Pitcher of water

Medicine dropper

Paper straws or drinking tubes

Teaspoon

Paper wipes

### PROCEDURE:

## Preparation of Medicines:

- 1. Wash your hands!
- 2. Unlock cabinet. Remove cards from board.
- 3. Arrange cards in sequence similar to placement of patients on ward. Stack cards so that one card is visible at one time.
- 4. Take first card: Locate and remove medicine from shelf.



Figure 64.—Equipment for Administration of Medicine by Mouth.

- 5. Read label: Compare label with card, place card on tray.
- 6. Obtain medicine glass, read label: Place medicine in glass, place glass on card in tray.
- 7. Read label: Check medicine card with label on bottle; replace bottle on shelf.
  - 8. Repeat step 6 for remaining cards.

## Pill, tablet, capsule:

If in bottle, pour required number into lid of bottle.

If in box, remove required number with spoon.



Figure 65.—Removing Tablet From Bottle.

#### Powder:

If in paper—empty into medicine glass, add water, stir with stirring rod.

If measured with spoon—empty into medicine glass, add water, stir with stirring rod.

## Liquid:

Shake bottle.

Remove cap. Place it inside up, on shelf.

Hold medicine glass in left hand so that mark of prescribed amount is at eye level. Place thumbnail at mark.

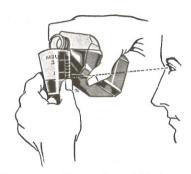


Figure 66.—Pouring Liquid Medication.

Hold bottle in right hand with label next to palm; pour designated amount.

Wipe rim of bottle with paper wipe; replace cap. Dilute medicine with ½ ounce of water unless contraindicated.

#### Drops:

Use medicine dropper.

Draw up approximate amount of drug from bottle.

Holding dropper at 45° angle, count prescribed number of drops into medicine glass.

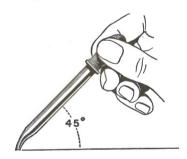


Figure 67.—Correct Angle of Medicine Dropper.

### Minims:

Use minim glass.

Follow same procedure as given under Liquid.

### Administration of Medicines

- 1. Carry tray to ward.
- 2. Identify patient.
  - a. Read bed tag.

- b. Check tag with medicine card.
- c. Ask patient his name, compare with card.
- 3. Give medicine in glass to patient.
- 4. Give water with medicine unless contraindicated.
- 5. Stay with patient until medication has been taken; do not leave medication at bedside.
- 6. Place medicine glass to one side of tray; turn medicine card face down on tray.
- 7. Repeat steps 2 through 6 for remaining medications.

## After Care

- 1. Wash all glasses with hot soapy water; rinse. Boil glasses for 10 minutes.
  - 2. Wash spoons, droppers, pitchers and tray.
  - 3. Reset tray.
- 4. Chart medications. Return cards to board in correct order.

A wheeled cart may be used in place of tray; the set up and manner of administration remain the same.

## Medication by Sublingual Route (Under the Tongue)

Medicine is in quickly dissolving pill form. The pill is placed under the patient's tongue and allowed to dissolve. No water is given.

## Medication by Injection (Parenteral)

## PURPOSE:

To produce rapid systemic effect; to produce local reaction; to administer drug which is destroyed by gastric juices or when drug cannot be taken by mouth.

## METHODS OF INJECTION:

Intradermal—into the superficial layers of the skin. Used to test for specific allergic reactions.

Subcutaneous—under the skin. Used primarily to administer narcotics, sedatives.

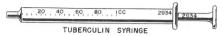
Intramuscular—into the muscle. Used when drugs are not suitable for intravenous injection, when a more rapid effect is desired than could be obtained by subcutaneous method, when drug is not readily absorbed, or when it is irritating to subcutaneous tissue.

Intravenous—into the vein. Used when very rapid effects are desired.

Intraspinous—into spinal canal. Used primarily for producing anesthesia.

#### SYRINGES FOR INJECTION

All syringes must be sterile; be of correct size for the medication to be administered and be handled with aseptic technique.



I cc. capacity—scaled in I/100 of a cc. Used for very small dosage when fractions of a cc. or small number of minims are desired



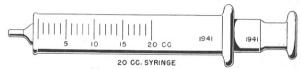
I cc. capacity—scaled in units per cc. Used for administration of insulin



2 cc. capacity—scaled in minims and 1/2 cc Used for injections of less than 2 cc.



10 cc. capacity — scaled in 2/10 cc. Used for injections of 5-10 cc. dosage



20 cc. capacity—scaled in cc. Used for injections 10-20 cc. dosage

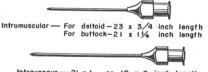
30 CC. SYRINGE — Scaled in cc. 50 CC. SYRINGE — Used for injections 20-50 cc.dosage (Not shown)

Figure 68.—Syringes for Injection.

### NEEDLES FOR INJECTION

Intradermal — 25 gauge x 1/2 inch length

Subcutaneous — 23 gauge x 3/4 inch length



Intravenous — 21 x I or 19 x 2 inch length

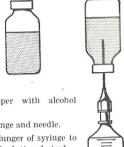


Figure 69.-Needles for Injection.

The use of individually wrapped autoclaved syringes and needles is required for intravenous and intraspinous injections and is *strongly recommended* for all injections. Autoclaved multiple

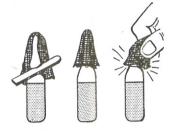
## PREPARATION OF MEDICINES FOR NEEDLE (PARENTERAL) INJECTIONS

#### MEDICINE FROM STOPPERED VIAL



- 1. Cleanse stopper with alcohol sponge.
- 2. Assemble syringe and needle.
- 3. Draw back plunger of syringe to the amount of solution desired.
- 4. Insert needle through center of stopper, push in plunger.
- 5. Invert vial; pull back on plunger, withdraw desired amount; remove needle.
- 6 Cover needle with alcohol sponge: check point for burrs and hooks.
- 7. Take to patient.

#### MEDICINE FROM AMPULE



- 1. Wipe file and neck of ampule with alcohol
- 2. File neck of ampule.
- 3. Cover ampule with sponge.
- 4. Break off neck of ampule at file marks.



- Assemble syringe and needle.
   Tip ampule to 45° angle.
- Insert needle into ampule, withdraw desired amount of solution. Cover needle with alcohol sponge; check point
- for burrs and hooks.
- 5. Take to patient.

#### MEDICINE IN TABLET FORM

- Place tablet on sterile 2 x 2. Pour distilled water into spoon of alcohol

- lamp.
  Boil water one minute; cap lamp.
  Assemble syringe and needle.
  Draw desired amount of water into syringe; discard remainder from spoon.
  Drop tablet into spoon; eject water from syringe over tablet until dissolved and solution is clear.
  Das all legistics into syringe
- tion is clear.

  7. Draw all solution into syringe.

  8. Cover needle with alcohol sponge; check point for burrs and hooks.

  9. Take to patient.



- Fractional dosage.

  1. Work out problem on paper.

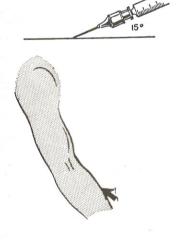
  2. Follow steps 1 through 7 above.

  3. Discard the necessary amount of solution as shown by answer to problem.

  4. Follow steps 8 and 9 above.

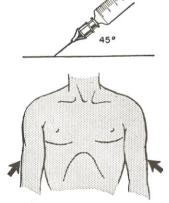
## ADMINISTRATION OF PARENTERAL MEDICINES

### INTRADERMAL



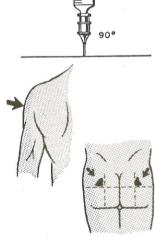
- 1. Explain to patient.
- 2. Swab site of injection with an alcohol sponge. Allow to dry.
- 3. Hold syringe upright, expel air bubbles.
- 4. Insert needle at a 15° angle, just under the skin, so that a raised area is seen.
- 5. Inject prescribed amount of solution.

#### SUBCUTANEOUS



- 1. Explain to patient.
- 2. Swab site of injection with an alcohol sponge.
- 3. Hold syringe upright; expel air bubbles.
- 4. Make a firm cushion of flesh at injection site.
- 5. Insert needle quickly at a 45° angle.
- 6. Draw back on plunger; if resistance is felt and no blood seen, slowly inject solution.
- 7. Place alcohol sponge over needle; quickly remove needle.
- 8. Gently massage site of injection with alcohol sponge for one minute.

#### INTRAMUSCULAR



- 1. Explain to patient.
- 2. Swab site of injection with an alcohol sponge.
- 3. Hold syringe upright; expel air bubbles.
- 4. Make a firm cushion of flesh at injection site.
- 5. Insert needle quickly at a  $90^{\circ}$  angle.
- 6. Draw back on plunger; if resistance is felt and no blood seen, slowly inject solution.
- 7. Place alcohol sponge over needle; quickly remove needle.
- 8. Gently massage site of injection with alcohol sponge for one minute.

Figure 70.—Preparation and Administration of Medicine for Parenteral Injection.

syringe and needle containers may be used when a number of injections are required over a short period of time.

## When autoclaved equipment is not available:

- 1. Boil syringe and needle for 10 minutes in sterilizer just before preparing medications (recommended method).
- 2. When a number of injections must be prepared, set up tray for injections using syringes and needles directly from the sterilizer.
- 3. Maintain sterile syringes and needles in a covered container of 70 percent isopropyl alcohol or benzalkonium chloride 1:1,000 solution. This method may be used after the syringes and needles have been boiled; it does not take the place of sterilization by heat. [Tests on dry sterile syringe container showed growth in 5 hours of use. Tests on sterile syringes in container of 70 percent alcohol showed no growth in 24 hours of use (NNMC)].

## Subcutaneous Injection

### **EQUIPMENT:**

Metal tray with—

Individually wrapped autoclaved syringes or autoclaved multiple syringe and needle container

Sterile covered container of alcohol sponges Sterile covered container of 2 x 2's

Thumb forceps in container of disinfectant solution

Rubber stoppered vial of sterile distilled water

Screw-capped bottle of distilled water Sputum cup without cover for waste Matches, ampule file, alcohol lamp



Figure 71.—Hypodermic Tray.

Disinfectant solution for thumb forceps may be: Isopropyl alcohol 70 percent.

Benzalkonium chloride 1:1,000 aqueous solution.

Liquid iodine-type disinfectant, 200 ppm available iodine (12 cc. to 1,000 cc. water).

Anti-rust agent, sodium nitrite, 0.5 percent, should be added to these solutions.

## CAUTION:

- 1. Use sterile technique in the preparation and administration of injections.
  - 2. Check numbers of syringe barrel and plunger.
- 3. Test needle for hooks and burrs before taking medication to patient.
- 4. Use separate syringe and needle for each injection.

## PROCEDURE:

## Preparation of syringe and needle:

Using individually wrapped autoclaved syringe and needle (recommended method):

- 1. Open syringe package touching only the outside of the package.
- 2. Remove plunger and insert into barrel of syringe.
  - 3. Pick up needle with tip of assembled syringe.
- 4. With fingers tighten the needle on the syringe.

Using autoclaved multiple syringe and needle container:

- 1. Using forceps, remove assembled syringe.
- 2. Using forceps, remove needle and place on tip of syringe.
  - 3. With fingers, tighten needle on syringe.

Using syringe and needle directly from sterilizer:

1. Using technique forceps:

Remove syringe barrel from sterilizer; check number on barrel.

Pick up plunger having same number; insert it into barrel.

Pick up needle and attach it to the syringe.

- 2. With fingers, tighten needle on syringe.
- 3. Push plunger back and forth to expel excess water.

Using syringe and needle maintained in container of alcohol:

1. Using forceps, remove alcohol sponge from container; place sponge on top of distilled water vial.

## 2. Using forceps:

- a. Remove syringe barrel from container; check number on barrel.
- b. Pick up plunger having the same number; insert it into barrel.
- c. Pick up needle and attach it to syringe. Tighten needle.
- 3. Push plunger of syringe back and forth to expel alcohol.
- 4. Wipe top of water vial with alcohol sponge; discard sponge.
  - 5. Remove 1 cc. of water from vial.
  - a. Rinse syringe by pushing plunger back and forth. Discard water into sink.

## Preparation of solution:

- 1. Refer to figure 70 for preparation of medicine from stoppered vial, ampule, and for tablets not readily dissolved (example: codeine, Pantopon).
  - 2. Using tablets readily dissolved—

Place tablet on sterile 2 x 2.

Wipe top of distilled water vial with alcohol sponge; discard sponge.

Remove 1 cc. of water from vial.

Cover needle with alcohol sponge; remove plunger.

Drop tablet into barrel or pick up tablet with the wet tip of the plunger.

Holding the barrel at 45° angle, gently insert plunger, avoid dispelling water.

With needle covered by sponge and plunger secured by finger tip, gently agitate syringe until tablet is dissolved and solution is clear.

### Administration of injection:

Figure 70 presents proper methods of intradermal, subcutaneous and intramuscular methods of parenteral administration.

## Care of Equipment

## After each use:

- 1. Rinse syringe and needle with cool water, detergent, cool water.
- 2. If autoclaved equipment was used, return to CDR.
  - 3. If container of alcohol was used:
    - a. Separate barrel, plunger and needle.
    - b. Place in sterilizer, boil 10 minutes.
  - c. Using forceps, return boiled syringe and needle to sterile container of alcohol.
- 4. Discard waste from hypodermic tray; reset and restock as needed.

## Daily:

- 1. Strip entire tray.
- 2. Wash and boil containers for sponges.
- 3. Send multiple syringe container to CDR for autoclaving.
- 4. Restock tray, fill containers with sponges, new multiple syringe container, box for waste. Add matches, ampule file and fill alcohol lamp as needed.
- 5. When using syringes and needles maintained in container of alcohol:
  - a. Wash and boil all syringes and needles.
  - b. Reset tray, refill containers with alcohol.

## Fractional Dosage

1. Work out the problem on paper using the formula:

$$\frac{\text{Dose desired}}{\text{Dose on hand}} \times \begin{pmatrix} \text{quantity of water in minims in which tablet(s)} \\ \text{are to be dissolved} \\ \text{solved} \end{pmatrix} = \begin{pmatrix} \text{dose to be} \\ \text{given in minims.} \\ \text{minims.} \end{pmatrix}$$

## Example:

If the dose on hand is larger than the dose desired:

Dose desired: Morphine sulfate ½ grain. Dose on hand: Morphine sulfate ¼ grain.

$$\frac{\frac{1}{6}}{\frac{1}{4}} \times \text{quantity} = \text{dose}$$
 $\frac{1}{6} \times \frac{4}{1} \times 24 \text{ min.} = 16 \text{ minims}$ 

### Answer:

Dissolve one (¼ grain) tablet of morphine sulfate in 24 minims of water. Discard 8 minims—give 16 minims to patient.

#### Example:

If the dose on hand is less than the dose desired it will be necessary to use two or more tablets.

Dose desired: Morphine sulfate ½ grain.

Dose on hand: Morphine sulfate ½ grain.

Therefore it will be necessary to use 2 tablets.

$$\begin{array}{l} \frac{\frac{1}{6}}{\frac{1}{8}\times2}\times24\\ \frac{\frac{1}{6}}{\frac{2}{6}=\frac{1}{4}} \qquad \frac{1}{8}\times\frac{4}{1}\times24=16 \text{ minims} \end{array}$$

### Answer

Dissolve two (½ grain) tablets of morphine sulfate in 24 minims of water; discard 8 minims, give 16 minims to patient.

## Intramuscular Injection

Prepare solution and administer medication as illustrated in figure 70.

## Intravenous Injection

Corpsman is not responsible for intravenous injections of medicine. If in an emergency he is required to do so, the angle of injection is the same as illustrated under Technique of Venipuncture, chapter X, Laboratory Techniques and Procedures. Strict aseptic technique must be used.

## PROCEDURE:

- 1. Prepare solution as required by packaging. Use No. 19 gage, 2-inch needle.
- 2. Take prepared syringe and tourniquet to patient.
- 3. Select site of injection; swab site with alcohol sponge; place tourniquet under arm above site.
  - 4. Tighten tourniquet; doctor will insert needle.
- 5. When blood appears in the syringe, loosen tourniquet.
  - 6. Doctor will inject solution.
- 7. Place alcohol sponge over needle; doctor re-
- 8. Apply gentle pressure with alcohol sponge over injection site for a minute.

## SPECIAL MEDICINES FOR INJECTION

## Insulin

## Types of Insulin

Regular or standard insulin is available on the supply table in 10 cc. vials of two strengths: 40 units in each cc.; 80 units in each cc.

Isophane insulin (NPH) is available in 10 cc. vials of 40 units in each cc.

Protamine zinc insulin (PZI) is available in 10 cc. vials of 40 units in each cc.

CAUTION: All insulins should be stored in the refrigerator.

### Preparation of Insulin

- 1. Use a dry, sterile insulin syringe.
- 2. Use the measure on the syringe corresponding to the strength of the insulin.

Example: Regular insulin U35 has been ordered. Answer: Locate the U40 scale on the syringe;

obtain U40 per cc. strength insulin; withdraw insulin from the vial down to the U35 mark on the U40 scale.

- 3. Regular insulin should be clear and colorless.
- 4. Protamine zinc and isophane insulin are in suspension and the vials must be gently rotated and inverted several times immediately before use.
- CAUTION: If precipitate has become clumped or has formed a deposit of solid particles on the wall of the vial, discard and obtain a new supply.

### Administration

- 1. Check date on vial. Do not use beyond date of expiration.
- 2. Give the insulin subcutaneously, at the correct angle of injection. Avoid too deep or too shallow injections.
- 3. Change the site of injection each time a dose is given. Use both upper arms and anterior thighs in rotation.
  - 4. Time of administration:
  - a. Regular insulin—usually 20 minutes before
  - b. Protamine zinc—once daily, either in the morning ½ to 1½ hours before breakfast, or in the evening 1 hour before supper, or before retiring.
  - c. Isophane—once daily. usually breakfast.
- 5. Two types of insulin may be ordered for the patient. Ask the doctor if he wishes them to be administered in the same injection. following method is suggested.

## Mixing two types of insulin:

Wipe tops of both vials with alcohol sponge. Insert sterile 23 gage needle into each vial.

Without air in the sterile syringe, attach syringe to needle in regular insulin vial.

Withdraw prescribed amount of insulin, remove needle and syringe.

Remove needle from second vial.

Insert needle with attached syringe of regular insulin into second vial.

Withdraw prescribed amount of insulin, remove

Gently shake syringe to obtain an even distribution of solution.

CAUTION: Do not pull back on plunger of syringe before attaching to needle in vial of insulin. If either vial of insulin is accidentally mixed with the other type insulin, discard both vials, order new supply.

### Medicines in Oil

1. Warm solution in water bath.

2. Use a large bore needle (18g) to remove solution from the ampule or vial.

3. Give medication as an intramuscular injection into the buttocks.

### Antibiotics

1. Use autoclaved or boiled syringes and needles whenever possible.

2. If syringe has been in alcohol, rinse thoroughly with sterile distilled water before taking up an antibiotic. Alcohol destroys the effectiveness of the antibiotic.

## MEDICATION BY INHALATION

Medication may be in the form of gases or volatile drugs and given for their local or systemic effect.

### Steam Inhalation

#### PURPOSE:

To provide moist heat and relieve congestion in upper respiratory passages.

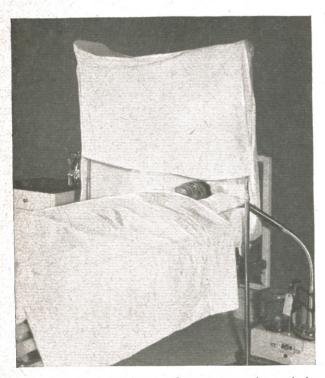


Figure 72.—Steam Inhalation. Croup tent may be made by draping blanket over two irrigating stands.

### Method I

### **EQUIPMENT:**

Vaporizer

Medication, if ordered

Water

Bath towel

CAUTION: Prevent burning the patient. Keep vaporizer 12 to 18 inches away from patient. Do not wash vaporizer under running water; the electrical element must be kept dry.

### PROCEDURE:

## In utility room:

1. Fill vaporizer to water level mark.

2. Place medication as directed in instructions on vaporizer.

3. Plug in vaporizer; allow water to boil. Take to bedside.

### At bedside:

1. Bring patient to side of bed.

2. Place bath towel around patient's head.

3. Plug in vaporizer; turn spout so that steam is directed toward the patient.

4. Ask the patient to open his mouth and take deep breaths.

5. Treatment should last about 20 minutes.

## After treatment:

1. Dry patient's face.

2. Prevent patient's being chilled. Caution him to stay inside ward until at least ½ hour after treatment.

### Method II

### EQUIPMENT:

Wash basin

Pitcher

Paper bag

Bath towel

Towel

Medication

Boiling water

CAUTION: Patient must not touch pitcher; ask him to keep his hands at his side.

## PROCEDURE:

1. Place pitcher in basin.

2. Cut hole in bottom of paper bag to fit over the mouth and nose of the patient.

3. Pour boiling water into pitcher.

4. Take to bedside.

- 5. Have patient place his mouth and nose over hole in paper bag.
- 6. Drape bath towel over patient's head and over the pitcher.
- 7. Ask patient to open his mouth and take deep breaths.



Figure 73.—Steam Inhalation by Pitcher Method.

## Medication by Nebulization

### PURPOSE:

To produce local or systemic effect by application of medication to the respiratory tract.

By forcing a stream of air over a nonvolatile drug in the nebulizer a fine mist or spray is created which contains minute particles of the drug. Such drugs may be administered by using oxygen or a hand nebulizer.

## Method I

Using oxygen. To be used only when aqueous solutions of medication are to be administered.

#### **EQUIPMENT:**

Oxygen cylinder Flow regulator Rubber tubing, 3 feet Nebulizer Aqueous solution ordered

## PROCEDURE:

1. Assemble oxygen cylinder, tubing and regulator as for oxygen therapy. Set flow at 4 to 6 liters.

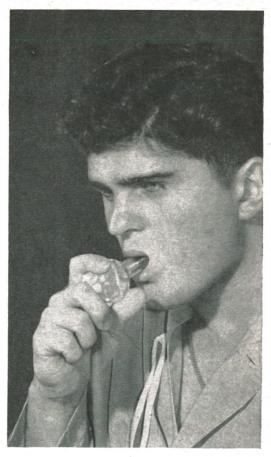


Figure 74.—Nebulizer in Use.

- 2. Place drug in nebulizer and connect nebulizer to tubing.
- 3. Instruct patient to place mouthpiece of nebulizer in mouth and to keep lips closed during the treatment.
- 4. Treatment lasts approximately ½ hour or until all medication is used.

### Method II

Using hand nebulizer. To be used when oily solutions of medications are to be administered.

### **EQUIPMENT:**

Hand nebulizer Solution ordered

### PROCEDURE:

- 1. Place drug in nebulizer.
- 2. Instruct patient to:

Place mouthpiece in mouth.

Inhale with lips closed around mouthpiece.

Squeeze bulb of nebulizer as he inhales.

Remove mouthpiece and exhale.

Repeat procedure until all medication has been used.

Alternate normal respirations with medicated ones if patient desires.

## Methods I and II

Record date, time, medication, method used, and effect of treatment in Nursing Notes.

Wash nebulizer in warm soapy water, rinse and dry after each treatment.

If possible, allow nebulizer to remain in patient's unit until doctor discontinues the order. When order has been discontinued, or the nebulizer must be used for other patients, follow the washing by soaking the nebulizer in benzalkonium chloride 1:1,000 solution or similar disinfectant.

## MEDICATION BY RECTUM

Medications may be administered by means of retention enemas or suppositories.

### **PURPOSE:**

To produce a local or systemic effect.

## INDICATED:

In presence of nausea or vomiting, when administration by mouth is impossible, when drug is unpalatable.

### Retention Enema

Total quantity of fluid should not exceed 120 cc. Irritating drugs such as paraldehyde and sodium salicylate are best given in a thin solution of corn starch. See Retention Enema procedure.

## Suppository

Drug is mixed with a solid which melts at body temperature.

#### **EQUIPMENT:**

Prescribed suppository
Finger cot or rubber glove
Lubricant
Toilet tissue

### PROCEDURE:

- 1. Take equipment to bedside in curved basin.
- 2. Screen patient; ask or assist him to turn on his side.
  - 3. Expose rectum.
  - 4. Put on glove or finger cot (index finger).
  - 5. Lubricate glove.
- 6. Introduce suppository gently into rectum and advance it as far as possible. If patient has difficulty retaining suppository, apply pressure over rectum until the desire to defecate has passed.
  - 7. Remove glove; place in curved basin.

## In utility room:

Wash and boil basin and glove. Discard finger cot.

## LOCAL APPLICATIONS OF MEDICATIONS

Medications may be applied locally in the form of lotion, ointment or paste.

## Application of Lotion

### **EQUIPMENT:**

Lotion prescribed Shallow dish Cotton pledgets

### PROCEDURE:

- 1. Pour lotion into shallow dish.
- 2. Apply lotion to area, using cotton.

## Application of Ointment or Paste

## **EQUIPMENT:**

Ointment or paste prescribed Tongue blade or spatula Gauze or soft muslin Bandage or binder

### PROCEDURE:

- 1. With tongue blade, remove ointment from container.
  - 2. Spread a thin layer of ointment on gauze.
  - 3. Apply coated gauze to area.
  - 4. Secure with bandage or binder.

NOTE: When applied to wound, sterile articles must be used and aseptic technique maintained.

## ADMINISTRATION OF OXYGEN 5

Review——Chapter II, "The Respiratory System"

Chapter VI, "Safety"

#### PURPOSE:

To make an extra supply of oxygen available to the patient.

#### INDICATED:

In conditions of anoxia (lack of oxygen) and anoxemia (lack of oxygen in blood). Some symptoms of anoxia are cyanosis and dyspnea, rapid thready pulse and restlessness. Oxygen is used as a supportive measure for patients with pneumonia, asthma, cardiac failure, decompensation, thrombosis, and shock; and is sometimes used for postoperative patients.

## SAFETY RULES IN USE OF OXYGEN

### In Storerooms

## Oxygen cylinders:

- 1. Keep cylinders secured (strap, chain) in upright position in a separate place away from oil, grease, gasoline, matches, alcohol, ether; from heating equipment, boilers, furnaces, radiators, steam pipes, sterilizers, autoclaves.
- 2. Have storage space well posted with "Oxygen—No Smoking" signs.
  - 3. Keep caps on all cylinders.
- 4. Have separate and clearly marked place for storing full and empty cylinders.
- 5. Attach DD Form 1191—Warning Tag for Medical Oxygen Equipment—to each cylinder.
- 6. When removing cylinder from storeroom, remove cap, open and close valve quickly. This is called "cracking" the valve. Replace cap.





Figure 75.—Cracking the Valve.

 $^5$  Adapted from  $\it Oxygen$   $\it Therapy$   $\it Handbook.$  Linde Air Products Co., 1943, 1957. New York.

## Regulators:

- 1. Store in closed cabinets.
- 2. Label all regulators with tags "Do Not Oil or Grease."
- 3. Test regulators frequently for leaks and liter flow accuracy.
- 4. Do not attempt to repair regulators; return regulators to issue room.

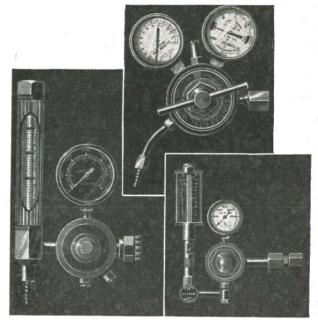


Figure 76.—Types of Regulators.

## Oxygen tent machines:

- 1. Store in cool, clean, dry rooms.
- 2. Use muslin dust covers (may be made in the sewing rooms) to keep apparatus clean.
- 3. All electrically operated oxygen machines should be grounded. Check with the electrician at your station.
- 4. Set up and test motor operation at regular intervals every 2 to 3 weeks.

### On Ward

1. Post "Oxygen—No Smoking" signs at the entrance to the ward, room or unit.

- Strap oxygen cylinder to bedpost or to carrier to keep it in an upright position. Cylinder should be placed away from radiators.
- 3. Instruct all patients and visitors not to smoke within the area.
- 4. Always have an extra cylinder of oxygen on hand to assure patient a continuous supply. Watch usage rate of oxygen.

Table III.—Approximate Remaining Hours of Service in Standard 244-Cubic Foot and 220-Cubic Foot Cylinders of U.S.P. Oxygen <sup>1</sup>

Rate of flow in liters per minute	244 cubic feet; 2,200 pounds; 6,900 liters	220 cubic feet; 2,000 pounds; 6,200 liters	165 cubic feet; 1,500 pounds; 4,650 liters	110 cubic feet; 1,000 pounds; 3,100 liters	55 cubic feet; 500 pounds; .1,550 liters
1	Hours 28 19 14 11 9 8 7	Hours 25 17 12 10 8 7 6	Hours 19 12 9 7 6 5 4	Hours 12 8 6 5 4 3 3	Hours 6 4 3 2 2 1 1 1

<sup>1</sup> Ohio Chemical & Surgical Equipment Co., 1400 East Washington Ave., Madison, Wis.

Examples: Full cylinder, at 2,200 pound pressure, flowing at rate of 6 liters should last approximately 19 hours. A cylinder with 1,000 pound pressure flowing at a rate of 8 liters per minute should last 6 hours.

5. When an oxygen tent is in operation:

Be sure the electrically operating oxygen machine is grounded. Check with the electrician at your station.

Do not use electrical devices (call bells, heating pads, vaporizers) inside tent.

Do not use alcohol or ether inside tent.

Keep patient clothed in cotton material; wool and nylon are dangerous because of their static electrical properties.

6. To attach regulator to cylinder:

Remove cylinder valve cap. Insert regulator inlet into cylinder valve outlet and tighten inlet nut with wrench (fig. 77a).

CAUTION: Before opening cylinder valve, always loosen regulator flow adjusting knob (fig. 77b).

Open cylinder valve slowly until needle of cylinder gage stops moving (fig. 77c).

Turn flow adjusting knob until desired rate of flow shows on flow indicator gage (fig. 77d).

7. To disconnect regulator and cylinder: Close valve tightly (fig. 78a).

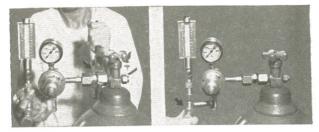






Figure 77.—A, B, C, D. Attaching Regulator to Cylinder.

Wait until both cylinder and flow gages have registered zero (fig. 78b).

Loosen flow adjusting knob (fig. 78c). Unscrew inlet nut. Remove regulator. Recap cylinder.







Figure 78.—A, B, C. Disconnecting Regulator and Cylinder.

8. Mark cylinders before returning them to storeroom. When empty:

Remove regulator.

Close valve; replace cap.

Label cylinder "empty." Use shipping tag or piece of adhesive tape.

## METHODS OF ADMINISTRATION

The method of administering oxygen is selected by the doctor. He may order oxygen to be given through a nasal catheter, by face mask, or by the tent method.

Mental preparation of patient for all methods.— The patient is able to obtain maximum benefit from oxygen only when any fear, anxiety or suspicion existing in patient's mind is relieved. Explain, reassure, and demonstrate what is to be done, how it will relieve him, and what he must do to get the best results.

## Nasal Catheter Method

### **EQUIPMENT:**

Oxygen cylinder, flow gage (regulator), humidifier

Lubricant (water soluble) and tissue

Four feet of rubber tubing

Catheter (Nos. 8 to 14 French) with extra holes as near tip as possible

Connector (from tubing to catheter)

Rubber band and safety pin

Wrench

Glass of water

Adhesive—1 small piece to mark catheter. Two 6-inch strips of ½ inch width split half way down

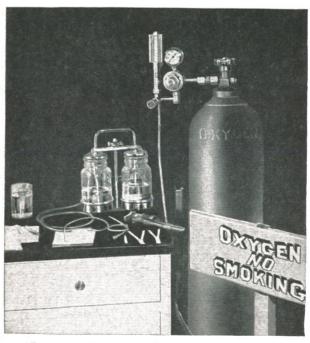


Figure 79.—Equipment for Nasal Catheter Method.

#### PROCEDURE:

## Preparation of equipment in utility room:

- 1. Open and close valve of oxygen cylinder.
- 2. Fill humidifier with water to level mark. Attach tubing.
- 3. Using wrench, attach regulator and humidifier to cylinder.
- 4. Select largest sized catheter that can be inserted comfortably in patient's nose.
  - 5. Attach catheter to tubing with connector.

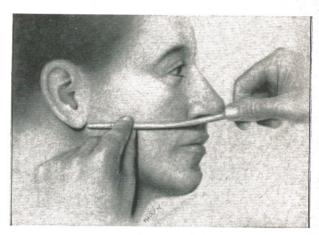


Figure 80.—Measuring Catheter.

### Preparation of patient:

- 1. Tell patient how and what you are going to do.
- 2. With the catheter, measure the distance from the tip of the patient's nose to the lobe of his ear; mark this point on the catheter with a small piece of tape (fig. 80).
- 3. Turn valve on oxygen cylinder and adjust flow on regulator to 5–6 liters per minute.
- 4. Place small amount of lubricant on tissue; pass catheter lightly through the tissue (fig. 81).

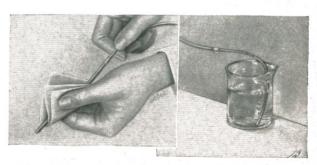


Figure 81.—Lubricating Tube.

Figure 82.—Testing Patency of Tube.

- 5. Hold tip of catheter in glass of water to be sure holes are not plugged (fig. 82).
- 6. Holding the catheter at the taped mark, rotate and find when its tip hangs at lowest level (fig. 83).

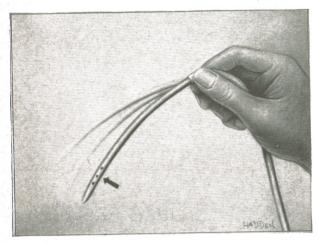


Figure 83.—Finding the Droop of Catheter.

- 7. Holding catheter in this position and with the oxygen flowing, insert the catheter into patient's nose slowly up to the taped mark (fig. 84).
- 8. Ask the patient to open his mouth; the tip of the catheter will be seen opposite the uvula.
- 9. Tape catheter firmly at tip or side of nose and forehead.
  - 10. Loop elastic band around tubing and pin

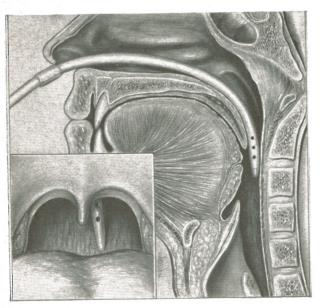


Figure 84.—Position of Catheter.

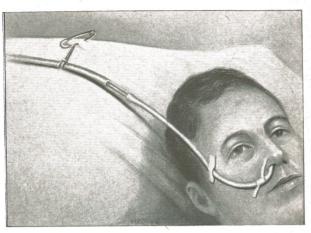


Figure 85.—Taping Catheter in Place.

to bedding, leaving enough tubing to allow patient to move about in bed (fig. 85).

## Care of Patient with Nasal Catheter

- 1. Apply water soluble lubricant about nostril every 4 hours and p.r.n.
  - 2. Give mouth care every 4 hours.
  - 3. Give fluids frequently.
- 4. Watch patient; if he shows signs of restlessness, dyspnea, cyanosis, check supply and flow of oxygen and the water level in humidifier. Check opening of catheter.
- 5. Always have a clean catheter ready at bed-side.
- 6. Catheter should be changed every 12 hours and more frequently if nasal secretions make it advisable. Use alternate nostrils each change

### Care of Catheters After Use

- 1. Wash catheters; boil 5 minutes.
- 2. Return to proper department.

## Face Mask Method

## EQUIPMENT:

Mask

Oxygen cylinder, regulator, water bottle (humidifier).

Wrench

Four feet of rubber tubing and connecting tip Rubber band, safety pin

### PROCEDURE:

In utility room:

- 1. Open and close valve of oxygen cylinder.
- 2. Fill humidifier to water mark.
- 3. Connect regulator, humidifier, tubing and mask.

### At bedside:

- 1. Strap cylinder to bedpost.
- 2. Turn on oxygen 6-10 liters per minute.
- 3. Tell patient what you are going to do.
- 4. Apply mask to patient's face. Ask him to exhale as it is applied.
- 5. Adjust the head band so that the mask fits snugly but not too tightly.
- 6. Reduce liter flow to 6–8 per minute (or rate ordered by doctor) after patient is accustomed to the mask.

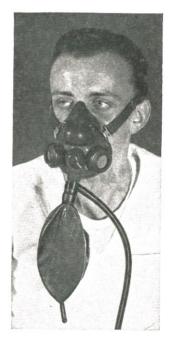


Figure 86.—Face Mask in Position.

7. Loop elastic band around tubing and pin to bed. Be sure tubing is long enough to allow patient to move about in bed.

### Care of Patient with Mask

1. Every 1½ to 2 hours:

Remove mask to sponge and dry patient's face and inside of mask.

Give fluids to drink.

Reapply mask.

- 2. Watch rebreathing bag; it should expand when patient exhales and deflate when patient inhales.
- 3. Oxygen concentration is controlled by liter flow.

For almost 100 percent oxygen concentration, adjust liter flow to 6 to 8 per minute so that bag never completely collapses during inspiration.

For 50 to 80 percent oxygen concentration, adjust flow to 5 to 6 liters per minute so that bag collapses during inspiration.

For 40 to 50 percent oxygen concentration, adjust flow to 4 to 5 liters per minute so that bag collapses during inspiration.

4. Patient should be comfortable with no dyspnea, cyanosis; pulse should be slower and of better quality. If he isn't comfortable, check oxygen supply, mask for leakage about nose and mouth. Small piece of gauze or cotton over bridge of nose or on chin may be necessary to prevent leakage.

## Care of Mask After Use

- 1. Take mask apart.
- 2. Wash all parts of mask thoroughly with soap and warm water; rinse. Wrap mask in cloth or gauze; boil 5 minutes.
- 3. Dry and reassemble mask; return to proper department.

### Tent Method

### EQUIPMENT:

Tent canopy

Oxygen machine

Iceless type—does not require ice and has own electrical air conditioning device

Ice type—requires ice (size of grapefruit) in cooling chamber, pail to catch water from melting ice

Oxygen cylinder, regulator
Wall thermometer to hang inside tent
Hand bell for patient
Wrench
Oxygen analyzer

## PROCEDURE:

## In utility room:

- Check canopy for leaks. Mend with cellutape.
- 2. Attach canopy to oxygen chamber. Close sleeves of canopy with clips or clothes pins. Close all zippered openings.
- 3. Fill ice chamber. Iceless type has own temperature control. Empty small drainage drawer on side of cabinet every 24 hours. Check and report any unusual sound in motor.

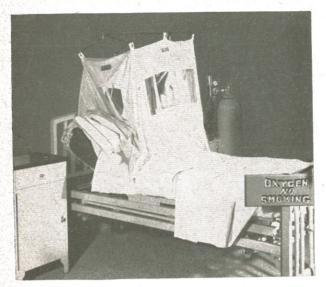


Figure 87.—Preparation of Bed and Oxygen Tent To Receive Patient.

4. Attach regulator to cylinder (if regulator is part of cabinet, attach to cylinder in patient's room).

#### At bedside:

- 1. Place rubber sheet between bottom sheet and mattress.
- 2. Place patient in a comfortable position (Fowler's position preferred).
- 3. Bring tent and cylinder to the head of the bed. Leave cylinder on carrier or strap cylinder to bedpost away from radiator.
  - 4. Place bath towel around patient's shoulders.
- 5. Make and check all connections; turn on oxygen to 15 liters a minute. Open shutters in cooling chamber; place pail under drain.
- 6. Place canopy over upper part of bed, tucking it well under mattress at sides and back. Bring front of canopy down toward foot of bed. Fold cotton sheet in fourths; place canopy within folds of sheets and tuck under mattress on both sides.
- 7. After 20 minutes, or when oxygen analyzer shows correct concentration, reduce oxygen flow to 8–10 liters per minute.

### Care of Patient in Tent

- 1. Every time tent is opened, oxygen is lost!
- When giving a bath or changing the bed— Draw canopy up to patient's chin; tuck sides

under pillows; increase liter flow to 12 to 15 per minute.

Use skin lotion for back rubs.

CAUTION: Always wash hands before readjusting liter flow after giving a back rub.

- 3. When giving fluids use tent sleeves rather than opening entire canopy.
- 4. Watch temperature inside tent—maintain at 68° F. Protect patient's head with towel or cap if he complains of cold.
- 5. Use oxygen analyzer every 4 hours to determine concentration. Follow directions on analyzer.



Figure 88.—Patient in Oxygen Tent. Note head covering, hand bell, side openings, instructions on machine, cylinde on carrier.

6. Watch patient carefully; he should be much more comfortable inside tent. If he isn't, check:

Oxygen supply, temperature.

Tent for leaks.

Inflow tube or shutter to see that it is not covered by mattress or bedding.

- 7. The tent is not soundproof; do not discuss patient's condition within his hearing.
- 8. Be sure he has a hand bell and paper wipes within his reach.

## Care of Tent After Use

- 1. If disposable type—discard.
- 2. Other types:

Wash with warm water and soap; rinse with cool water; dry.

Allow to air for 24 hours.

Return to proper department.

## THE ADMINISTRATION OF PARENTERAL FLUIDS

Review—Chapter II, "The Blood and Cardiovascular System"

Chapter X, "Blood Grouping and Matching"

The average intake of fluids by a normal individual of average size is about 3,000 cc. This intake consists of the fluid taken as fluid, the fluid taken in solid foods, and the water given up as a result of oxidation. The average output of fluid is about the same. This output is that excreted by the kidneys in the form of urine, that lost by the skin through evaporation, and that lost by the lungs through the expiration of air. Fluid is lost by the digestive tract in the form of feces. During illness fluids may also be lost through vomitus and hemorrhage.

When a large amount of fluid is lost by the body, it must be replaced. Ordinarily, adequate fluid intake may be maintained by fluids taken by mouth. When a patient is unable to take sufficient fluids by mouth or when his fluid loss has been so great that his intake must be supplemented, fluids are administered by other methods. The doctor may decide to supply fluid by gastric gavage, retention enema, hypodermoclysis, intravenous infusion, or transfusion. See Procedures Relating to Gastrointestinal Tract for gavage and retention enema procedures.

The administration of fluids by hypodermoclysis or intravenous methods is the responsibility of the doctor or of a nurse trained by him. The corpsman's role is one of assisting with these procedures. In order to assist intelligently he should know:

- 1. How to prepare his patient and his unit.
- What and how to prepare necessary equipment.
  - 3. How to assist the doctor.
- 4. What symptoms, reactions, are expected and what danger signs may occur as a result of the treatment.

### INTRAVENOUS THERAPY

### **DEFINITION:**

Introduction of large amounts of fluid into vein. PURPOSES:

To supply medication and fluids to body; to increase blood volume; to supply nourishment to body.

### **EQUIPMENT:**

Standard

Solution ordered

Container of alcohol sponges

Curved basin

Small covered rubber sheet

Technique forceps in container of disinfectant solution

Disposable intravenous set

Correct apparatus for fluid being administered

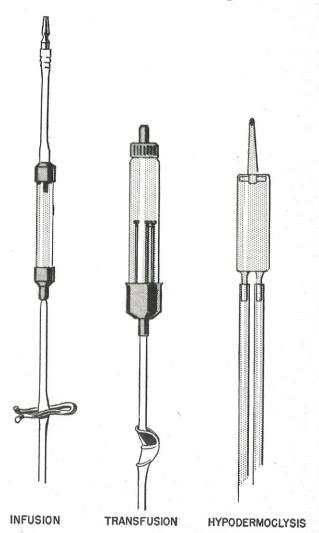


Figure 89.—Types of Drip Regulators.

Arm board

Bandage and scissors

Adhesive tape, ½-inch wide cut in 6-inch lengths

Tourniquet

Sterile needle pack from Central Dressing Room (CDR) containing 2 gauze flats, 1 airway needle, and a 19-gage by 1½-inch needle.

### Fluids

Fluids which may be administered intravenously are whole blood, plasma, blood volume expanders, solutions of physiologic saline, physiologic saline with glucose, dextrose and water, amino acids, buffer salts.

## Sites of Injections

- 1. Median cubital, cephalic or basilic veins.
- 2. Dorsalis pedis vein.

#### PROCEDURE:

## Preparation of patient and his unit:

- 1. Explain procedure to patient, tell him how he may help.
- 2. Do any nursing measures required before setting-up for intravenous infusion.
- 3. Offer bedpan or urinal; remove sleeve of gown from arm to be used.
- 4. Place small covered rubber sheet under arm and tourniquet above site of injection. Place arm board under arm, secure with bandage above tourniquet and at wrist (fig. 90).

NOTE: The use of a board to immobilize the arm during an intravenous infusion is often limited to those patients who are unable to remain quiet during the procedure. The arm of a patient who is to receive an infusion over an extended period of time may be immobilized more comfortably by using a pillow.

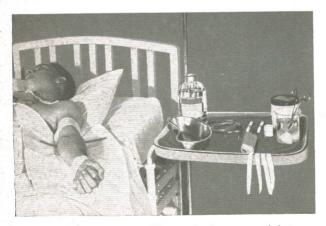


Figure 90.—Preparation of Patient for Intravenous Infusion.



 Remove metal strip around outside top



2. Remove metal disc



Remove rubber disc. Do not touch black rubber!

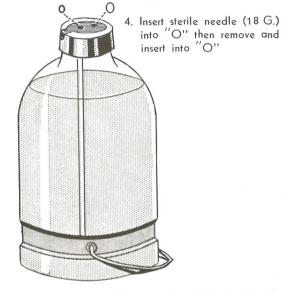


Figure 91.—Removing Cap of Solution Bottle.

- 5. Clear bedside stand of everything except equipment needed.
- 6. Place standard at foot of bed or fix pole attachment on bed.

### Preparation of solution:

- 1. Hold solution bottle up to the light. Solution should be clear without sediment or shred of mold.
  - 2. Remove cap (fig. 91).
- 3. Open needle pack; remove airway needle and insert into bottle. When airway needle is inserted, a rush of air into the bottle should be heard.
  - 4. Attach tubing—

Place clamp on tubing.

Remove protective rubber cap from tip of drip regulator; insert tip into large depression of rubber stopper of solution bottle.

Invert solution bottle; hang on standard.

5. Holding tubing higher than bottle, remove rubber cap from needle adapter. Open clamp, slowly lower tubing; allow solution to run through tubing into curved basin until entire tubing is filled with solution and all air bubbles are expelled. Attach needle; clamp tubing (fig. 92).

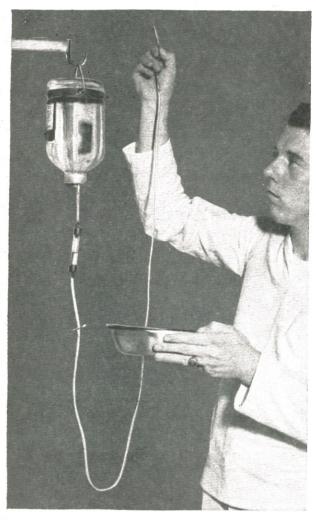


Figure 92.—Preparation of Solution.

## Injection of fluid:

- 1. Cleanse site of injection with alcohol sponge.
- 2. Apply tourniquet.
- 3. Doctor inserts needle. When blood appears in tubing, release tourniquet and open clamp.
- 4. Secure needle in place with adhesive. A gauze sponge may be necessary to hold needle at correct angle of injection.
- 5. Regulate flow 40 to 60 drops a minute or at rate ordered by the doctor.
  - 6. Watch for signs of reaction, infiltration.

## Care of Patient During Treatment

- 1. Watch for any sign of the patient's being chilly or shivering. Clamp tubing immediately. Notify ward doctor or nurse at once.
- 2. Keep patient quiet, especially that part of body where needle is inserted. Watch for and report any swelling around needle.
- 3. Watch the drip regulator and report if fluid stops flowing.
  - 4. Take pulse frequently; watch color of patient.

## Care of Patient After Treatment

 When solution bottle is almost empty— Clamp tubing.

Remove adhesive.

Place alcohol sponge over needle.

Withdraw needle; exert pressure over site of injection until bleeding stops.

- 2. Straighten patient's clothing and bedding; make patient comfortable.
  - 3. Take all equipment to utility room.

## Care of Equipment

- 1. Discard tubing.
- 2. Rinse needle with cold water; wash with warm soapy water; rinse. Use cotton applicator to clean hub of needle.
  - 3. Return needle pack to CDR.

## Infusion Dangers, Symptoms and Management

1. Know dangers of intravenous therapy. Reaction may be due to poor technique, too rapid administration, or patient's idiosyncrasy. Some dangers are:

Infection—due to unsterile equipment or poor technique.

Embolism—due to presence of air in tubing. Infiltration—due to needle being out of vein, causing fluid to enter tissues.

Incompatibility of blood—due to faulty crossmatching.

2. Symptoms of dangers of intravenous therapy:

Reactions—chill; increased pulse, respiration and temperature (spiking); vertigo; restlessness; hives; lumbar pain; dyspnea; cyanosis; nausea and vomiting.

Symptoms—infection (symptoms may be same as those listed under Reactions, they may appear immediately or be delayed); embolism or blood incompatibility (sudden dramatic pain, cyanosis, dyspnea, increased pulse rate); in-

filtration (swelling and coldness at site of injection—patient may or may not complain of pain).

3. Management of complications and reactions:
Stop intravenous infusion at first sign or
symptom

Notify doctor; give emergency measures.

In event of severe cyanosis and dyspnea, treatment may include oxygen.

In event of chill, apply extra blankets, hot water bottle to feet, warm or hot fluids by mouth if patient is able to take them.

Send tubing and containers for possible bacteriologic studies to Central Supply Room (CSR) or to blood bank as the case may indicate.

CAUTION: All intravenous therapy is started by doctor or trained assistant under direct supervision of the doctor. The following should be observed:

- 1. Only fluids especially prepared for intravenous therapy are to be used.
- 2. Intravenous therapy is administered under strict aseptic conditions and techniques.
- 3. Intravenous fluids are given at room temperature.
- 4. Use correct apparatus for the type of fluid to be given. Blood and plasma require the use of a factor.
- 5. Regulate flow of fluids as ordered by the doctor.
  - 6. Use separate tubing for amino acids.

## Charting—Nursing Notes

- 1. Time of start and completion of intravenous infusion.
  - 2. Amount, solution and by whom started.
  - 3. Any reaction noted.
  - 4. Signature.

## Blood Transfusion Using Plastic Unit

The administration of blood and the care of the patient follow the same procedures. The preparation of the plastic unit is slightly different; no airway vent is required and a special recipient set is used. Follow steps in fig. 93 in preparing the plastic unit.

## **HYPODERMOCLYSIS**

#### **DEFINITION:**

Slow introduction of a large amount of fluid into the subcutaneous tissue.

#### PURPOSE:

To supply body with fluids; to restore fluid balance; to supply fluids to the body when intravenous infusion is contraindicated.

#### **EQUIPMENT:**

Sheet

Standard or pole attachment on bed

Container alcohol sponges

Technique forceps in container of disinfectant solution

Disposable hypodermoclysis set

Solution

Package of sterile towels

One-half inch adhesive tape cut in 6-inch lengths Sterile needle pack from CDR (two gauze 4 x 4, one airway needle, two 18-gage 3-inch needles, two screw clamps)

### Fluids

Normal saline (physiologic saline); glucose 2 to 5 percent in normal saline.

## Sites of Injection

- 1. Anterior aspect of the thighs.
- 2. Subcutaneous tissue under breasts.

### PROCEDURE:

## Preparation of patient and his unit:

- 1. Explain procedure to the patient; tell him how he may help.
- 2. Do any nursing measures required before setting up hypodermoclysis equipment.
- 3. Clear top of bedside locker of everything except the equipment needed.
- 4. Place standard at foot of the bed or fix pole attachment on the bed.

### Preparation of solution:

- 1. Same as for Intravenous Infusion.
- 2. Apply screw clamp to each tube.
- 3. Attach 18-gage needle to each tube.

## Injection of fluid:

- 1. Fold back bedclothes to below site of injection
- 2. Place sheet over patient's body, exposing only area to be used.
  - 3. Cleanse site of injection with alcohol sponges.
  - 4. Fold sterile towel over bedclothes.
- 5. Doctor inserts needles into subcutaneous tissues.

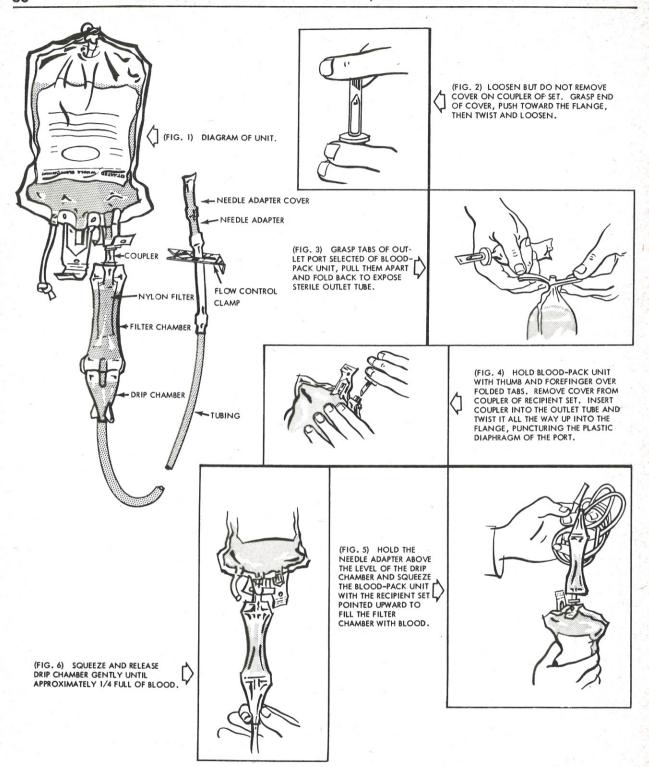


Figure 93.—Preparation of Plastic Unit for Transfusion.

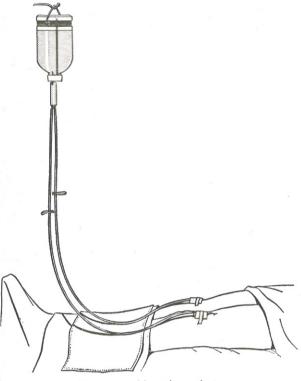


Figure 94.—Hypodermoclysis.

- 6. Open clamps; regulate flow to 40 drops per minute or rate ordered by doctor.
- 7. Place sterile 4 x 4's over needles; hold in place with adhesive tape.
  - 8. Place a sterile towel over field.

## Care of Patient During Treatment:

- 1. Watch the site of injection. If area becomes hard, blanched or painful, stop flow until the fluid is absorbed and then open clamp.
- 2. When solution has been given, clamp tubing; remove needles and cover site of injection with dry sterile dressings.

## Care of Patient After Treatment:

- 1. Place patient in a comfortable position, preferably other than the one he has maintained during the treatment.
  - 2. Take all equipment to utility room.

## Care of Equipment:

- 1. Discard tubing.
- 2. Rinse needles with cold water; wash with warm soapy water; rinse. Use cotton applicators to clean hubs of needles.
  - 3. Return needle pack to CDR.

## Charting—Nursing notes:

- 1. Time of the start and completion of the hypodermoclysis.
  - 2. Amount, solution, and by whom started.
- 3. Condition of site of injection on completion of treatment.
  - 4. Any other reactions noted.
  - 5. Signature.

## APPLICATIONS OF HEAT AND COLD

Review—Chapter II, "The Blood and Cardiovascular System"

"The Lymph and Lymph Vascular System"

"The Skin"

"The Nervous System"

The applications of heat and cold as described in this section will be limited to those procedures you will be likely to use on the ward or in sick bay. There are many other methods (lamps, diathermy) of applying heat and cold that are administered by the Physical Medicine Department.

## The Effects of Heat and Cold

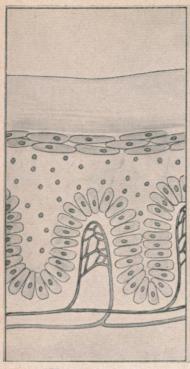
Heat expands; cold contracts. When two objects of different temperatures come in contact,

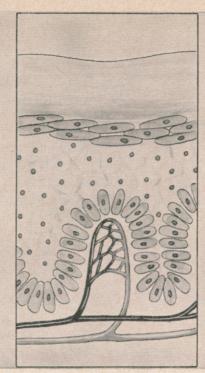
heat is lost to the cooler object. When moisture is present the effects are more penetrating. In the application of heat and cold to the body the same effects occur.

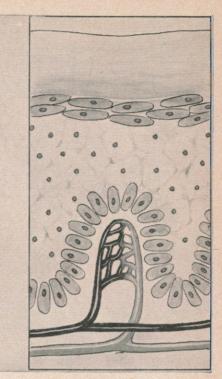
The form of application, the temperature at which it is to be applied, and the duration of the application, will be prescribed by the doctor.

### General Instructions

1. Always have a doctor's order for all applications of heat and cold.







EFFECTS OF COLD

Capillaries constrict. Less blood flows to the part. Circulation is lessened. Pain is relieved (anesthetic effect).

NORMAL

Figure 95.—Effects of Heat and Cold.

EFFECTS OF HEAT
Capillaries dilate. More blood flows to the part. Circulation improves. Pain is relieved. Drainage is promoted.

2. Always explain the procedure to the patient.

3. Always screen the patient when applying moist heat or cold.

4. Always wash your hands before starting procedures.

5. Always have a layer of cotton, flannel, or woolen cloth between the patient and any rubber or plastic materials.

6. Always watch the patient's skin closely for signs of redness, mottling, edema, or maceration.

7. Always chart procedure, noting-

Time of application.

Form of application.

The area to which it was applied.

The duration of the application.

The name, strength, and temperature of solution (moist applications).

The local or the systemic effects noted.

Your signature.

### APPLICATIONS OF DRY HEAT

Dry heat may be applied to the body by means of a heat cradle, an electric pad, or a hot water bottle.

PURPOSE.

To provide warmth and comfort; to relieve pain; to soothe and relax superficial tissue.

## Heat Cradle

Heat cradles are frames of various sizes equipped with electric light bulb(s) or heating element to provide warmth to the patients with circulatory disturbances or extensive burns.

## CAUTION:

- 1. Check all electrical connections and wiring before using cradle.
- 2. Be sure the cradle is large enough to cover the affected area and to permit the patient to move without being burned.
- 3. Secure the cradle to the bed to prevent it from slipping down over the side and burning the patient.
- 4. Note the temperature inside the cradle. Those having heating elements are controlled by thermostats. For those having electric light bulb(s):

Suspend a wall thermometer inside the cradle. Control temperature by turning bulb(s) on

and off. (The usual desired temperature inside the cradle is 90° to 95° F.)

5. Electric light bulbs should be 25 watt or less and covered by shields.

### Electric Pad

### CAUTION:

- 1. Check connections and wiring before using.
- 2. Keep temperature control on low.
- 3. Do not use with wet applications.

## Hot Water Bottle

#### **EQUIPMENT:**

Hot water bottle and cover Pitcher of water 120° F.

### PROCEDURE:

- 1. Test bottle for leaks.
- 2. Fill bottle one-half full.
- 3. Place bottle on flat surface; press from bottom of bottle until water appears in neck of bottle. Close tightly.
- 4. Wipe dry; test for leaks; place cover on bottle.
- 5. Apply bottle to prescribed area with neck of bottle away from patient's body.

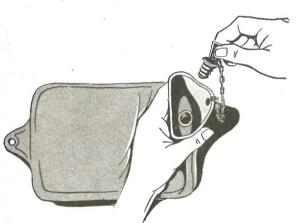


Figure 96.—Filling Hot Water Bottle.

## CAUTION:

- 1. Always cover bottle.
- 2. Refill as necessary to keep hot.
- 3. Observe patient's skin frequently for signs of redness, blistering, and pain.

## APPLICATIONS OF MOIST HEAT

Moist heat may be applied to the body by means of wet compresses, packs or baths. Irri-

gations and inhalations are also methods of applying moist heat and are discussed in detail elsewhere in the text. The purposes of applying moist heat are:

- 1. To relieve inflammation.
- 2. To provide comfort.
- 3. To relieve pain.
- 4. To hasten the localization of infection.

## Moist Hot Compresses (Clean)

### PURPOSE:

When moist heat is desired for a small area.

## EQUIPMENT:

Trav

Hot plate

Basin of water or solution (105° F.)

Compress of sufficient size to cover area—may be gauze or flannel or a washcloth

Curved basin

Rubber sheet and cover

### PROCEDURE:

 Place compresses in basin of solution on hot plate. Turn on hot plate.



Figure 97.—Moist Hot Compresses.

- 2. Place covered rubber sheet under part to be treated.
- 3. Wring out excess solution; place compress on part.
- 4. Repeat step 3 every 1 to 2 minutes for 20 minutes or for prescribed length of time.

### CAUTION:

1. Wring compresses dry as possible before placing on patient.



- 2. Observe skin carefully for redness, pain, and blistering.
  - 3. Keep hot plate on low after once heated.

## Sterile Hot Wet Compresses

Used when open lesion or wound is present.

### **EQUIPMENT:**

Tray

Hot plate

Sterile basin and solution (105° F.)

Sterile compresses.

Two sterile forceps

Curved basin

Rubber sheet and cover

#### PROCEDURE:

- 1. Wash Your Hands!
- 2. Place covered rubber sheet under part to be treated. Turn hot plate to *low*.
- 3. With forceps, place sterile compresses in basin of solution on hot plate.
- 4. With sterile forceps, wring out excess solution; apply slowly to part.
- 5. Repeat step 4 every 1 to 2 minutes for 20 minutes.

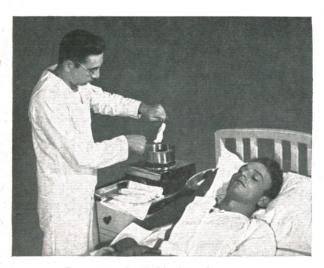


Figure 98.—Sterile Hot Wet Compresses.

## CAUTION:

- 1. Start compresses at low temperature (105° F.) to allow patient to become accustomed to them.
  - 2. Maintain aseptic technique.
- 3. Watch closely for signs of burning (redness, blisters, pain).

- 4. Wring out compresses as dry as possible.
- 5. Keep hot plate on low.
- 6. If infection and discharge are present, use each compress once only.
- 7. If for both eyes, use separate set-ups for each eye, wash hands between and after eye treatments.

### Local Packs

Local packs are used to provide moist heat to a large area. This is a clean procedure.

### EQUIPMENT:

Cotton flannel or pieces of old, clean blanketing Rubber or plastic sheeting

Sheet or bath towel for binder

Vaseline or oil for skin

Safety pins or bandage to hold binder in place Basin of water 110 to 115° F.

#### PROCEDURE:

- 1. Place flannel or blanketing in basin of water.
- 2. Place rubber sheet and binder under the part to be treated.
  - 3. Lubricate the skin.
- 4. Wring out the flannel as dry as possible; apply around part to be treated.
  - 5. Wrap rubber sheet around flannel.
- 6. Wrap binder around rubber sheet; pin or tie in place.
- 7. Change wet flannels every half-hour; note the condition of the skin. Report signs of puffiness, blisters, wrinkling, paleness of the skin.

## CAUTION:

- 1. Be sure flannel or blanketing is large enough to cover area.
- 2. Be sure flannels are wrung out as dry as possible to avoid burning patients by steam.
- 3. When applying wet flannel place it gently on the part and momentarily lift the corner to allow the escape of steam.
- 4. When packs are ordered continuously, expose the area to the air for one-half to one hour daily to help prevent maceration of the skin.
- 5. Hot water bottles are occasionally used to maintain a constant heat. Place them inside the binder next to the rubber sheet. Be sure they are no hotter than 120° F.
- 6. When a broken skin area or a wound is present, use sterile water, sterile abdominal pads for dressings; use sterile technique.

## Lay-on Packs

Lay-on packs may be used to provide moist heat to a large area to relieve painful muscle spasm. They are applied when the patient is in either prone or supine position. The areas to be packed and the frequencies of the packs are prescribed by the doctor.

The packs consist of three layers of material:

The inner or hot moist layer—old clean blanketing cut to fit the part to be treated.

The waterproof layer—plastic material, oiled silk or similar material cut to the same size.

The outer layer—blanketing cut slightly larger than the other layers.

### EQUIPMENT:

Pack machine
Several pieces of blanketing for inner layer
Waterproof material for middle layer
Blanketing for outer layer
Long handled forceps or tongs
Bath towels

#### PROCEDURE:

## Preparation of equipment:

- 1. Place pack machine in operation according to the directions on the machine.
  - 2. Place the inner layers in top of machine.
  - 3. Wheel machine close to bedside.

### Preparation of patient and unit:

- 1. Check the temperature of the unit (72° F.).
- 2. Place patient in desired position. See figure



Figure 99.—Application of Lay-on Pack.

49 for proper supine or prone position. Note the supports to be used.

3. Place outer and middle layer of pack in order of use on the patient's bed near the part to which they are to be applied.



Figure 100.—Lay-on Pack Showing Three Layers of Pack.
Note Patient's Position.

## Application of packs:

- 1. One corpsman removes one inner layer from machine with forceps.
- 2. Second corpsman receives inner layer, tests it for moisture, then gently applies it to the part. If it is too hot, the layer is raised, skin patted dry with a bath towel and the layer again applied. It is then quickly covered with waterproof material and the outer layer of dry blanketing. The three layers are then made to conform to the part being treated.

## Care of Patients During Packs

- 1. The inner layer may be changed as often as every 15 minutes, proceed as above. Have the new inner layer ready to apply before removing the outer and middle layers.
- 2. Watch the patient's color and pulse rate. A thready, irregular pulse, cyanosis, or pallor indicates that the pack should be discontinued.
- 3. Take the patient's temperature. If the temperature is high, cool sponging between packs may be necessary. An ice bag or cold compresses to the forehead may help the patient tolerate the packs.
  - 4. Force fluids.
- 5. Watch patient's skin. Dry body by gently blotting with a soft towel between packs.

6. Watch the body alignment. Maintain the patient's position in good anatomical alignment.

### Care of Patient After Pack

- 1. Dry body by gently blotting with a soft towel.
- 2. Place patient in a comfortable position or place in position prescribed by the doctor.
  - 3. Continue to give fluids frequently.
  - 4. Continue to observe patient.

## CAUTION:

- 1. Be gentle with the patient. If it is necessary to lift a part, lift at the joints. Avoid touching the body of the muscle.
- 2. Avoid burning the patient by testing inner layers for excessive moisture before applying; by raising the layer momentarily after applying it.
- 3. Watch patient closely for untoward reactions; i.e., change in color, increased pulse rate, profuse perspiration.
- 4. If patient complains of itching, place a single layer of fine gauze over the part to be treated and then apply the inner layer. If patient is allergic to wool, cotton material may be substituted.
- 5. In the presence of infectious disease use medical aseptic techniques. Keep pack materials separate for each patient.
- 6. Watch for signs of fungus growth on pack materials. Moldy odor is one of the first signs. Blanketing used for inner layers should be washed and allowed to dry completely every 24 hours.
- 7. Omit outer layer when pack is applied to the chest to avoid excess weight on patient's chest.

NOTE: If pack machine is not available, a sterilizer and a clothes wringer may be used. If these are not available: Boil packs in a wash boiler or large basin for 20 minutes. Use improvised wringer.

## EQUIPMENT (IMPROVISED WRINGER):

Two broomsticks or mop handles cut to 18-inch lengths One canvas or other heavy material 24 inches wide, 24 inches long

Sewing needle and stout thread or sewing machine

#### PROCEDURE:

- 1. Fold material lengthwise toward the center.
- 2. Lap over 3 inches of material at both ends and stitch.
- 3. Insert stick into loop at each end.
- 4. With forceps, place wet blanketing inside folded
- 5. Grasp sticks and wring dry by pulling outward and twisting.

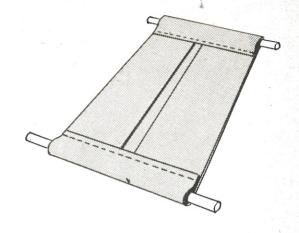




Figure 101.—Improvised Wringer.

### Hot Wet Soaks of Arm or Foot

## **EQUIPMENT:**

Foot tub one-fourth full of warm water (105° F.) Pitcher hot water (115° F.) Rubber sheet and cover Bath towel

## PROCEDURE:

- 1. Place covered rubber sheet under part to be treated.
  - 2. Place foot tub on rubber sheet.
  - 3. Place part to be treated in tub.
- 4. Pour hot water into tub slowly, away from patient's extremity; stir water as you pour.
  - 5. Repeat step 4 as necessary to keep water hot.
  - 6. Continue for 20 minutes.

### CAUTION:

- 1. Pour hot water away from extremity to avoid burning patient.
- 2. Have tub on level surface to avoid spilling water
  - 3. Cover top of tub to hold in heat.
  - 4. Watch skin carefully for signs of burning.

## Sitz Bath

Used in treatment of rectal, perineal, or pelvic conditions.

### EQUIPMENT:

Same as for Tub Bath.

#### PROCEDURE:

Same as for Tub Bath except—

- 1. Amount of water should be sufficient to cover patient's hips.
  - 2. Temperature of water should be 110° F.
- 3. Duration of treatment—20 minutes unless time is specified by doctor.

CAUTION: If patient shows signs of dizziness, fainting, or exhaustion, stop treatment, drain water from tub, cover patient with blanket. Report to doctor.

## APPLICATIONS OF DRY COLD

Dry cold is usually applied to the body by means of an ice bag or ice collar.

### PURPOSE:

To check inflammation; to relieve pain; to check bleeding.

Ice Bag

## EQUIPMENT:

Ice bag and cover

Cracked ice (size of walnut)

#### PROCEDURE:

- 1. Test bag for leaks.
- 2. Fill bag one-fourth full of ice.
- 3. Place on flat surface; press from bottom of bag until ice appears in neck of bag. Close tightly.
  - 4. Wipe dry; test for leaks; place inside cover.
- 5. Apply bag to prescribed area with neck of bag away from patient's body.

### CAUTION:

- 1. Always cover bag.
- 2. Change cover when it becomes moist.

- 3. Refill as necessary to keep cold.
- 4. Observe patient's skin frequently for signs of mottling, numbness, pallor, complaint of burning sensation.

### Ice Collar

Follow same procedure.

Used crushed ice.

Cover collar by wrapping it with gauze bandage.

## APPLICATIONS OF MOIST COLD

Moist cold may be applied to the body by means of compresses and baths.

### PURPOSE:

To prevent or reduce swelling; to relieve pain; to reduce temperature.

## Cold Moist Compresses (Clean)

### $Method\ I$

## **EQUIPMENT:**

Tray

Basin of ice water

Compresses of sufficient size to cover area—may be gauze or flannel or a washcloth

Curved basin

Rubber sheet and cover

### PROCEDURE:

- 1. Place covered rubber sheet under part to be treated.
  - 2. Place compresses in ice water.
- 3. Wring out excess solution; place compresses on part.



Figure 102.—Clean, Cold Moist Compresses, Method I.

4. Repeat step 3 every 1 or 2 minutes for 20 minutes or for prescribed period of time.

## CAUTION:

- 1. Watch skin carefully for signs of blanching, mottling.
- 2. Wring compresses dry as possible before placing on patient.

Method II

## EQUIPMENT:

Tray
Wash basin
Gauze 18 x 18
Block of ice
Compresses
Curved basin
Rubber sheet and cover

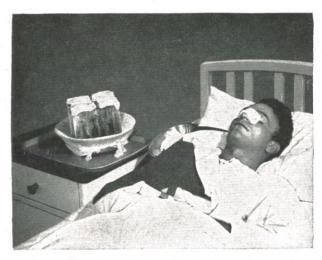


Figure 103.—Clean, Cold Moist Compresses, Method II.

### PROCEDURE:

- 1. Secure gauze over top of basin.
- 2. Wash off ice; place on gauze.
- 3. Moisten compresses with clear water, place on ice.
  - 4. Proceed as in steps 3 and 4, Method I.

### Cold Moist Compresses (Sterile)

## EQUIPMENT:

Tray
Face basin with cracked ice
Sterile solution basin, solution
Two sterile forceps
Sterile compresses (gauze)
Curved basin
Rubber sheet and cover



Figure 104.—Sterile, Cold Moist Compresses.

#### PROCEDURE:

- 1. Place rubber sheet under part to be treated.
- 2. With sterile forceps, place sterile compresses in solution basin; then place basin in cracked ice.
- 3. With sterile forceps, pick up compress; wring out excess solution; apply to part.
- 4. Repeat step 3 every 1 to 2 minutes for 20 minutes.

Bath—Tepid or Alcohol Sponge

### PURPOSE:

To reduce fever.

## INDICATED:

When ordered by the doctor or for patients with fever of 103° F. and above.

### EQUIPMENT:

Bath basin

Seven washcloths or pieces of gauze

Bath and hand towels

Rubber and cotton draw sheet

Hot water bottle and cover

Ice cap and cover

Solutions:

Water at 95 to 100° F.

Equal parts water and alcohol at 95 to 100° F.

#### PROCEDURE:

- 1. Preparation of patient and his unit is the same as for a Cleansing Bed Bath. In addition, place the rubber and cotton draw sheets under him, the ice cap to his head and the hot water bottle to his feet.
  - 2. Order of sponging patient:

Wring out washcloths in solution; place one



Figure 105.—Equipment for Sponge.

in each axilla, groin, and under each knee. Replace washcloths frequently.

Follow same order in sponging patient as for

Cleansing Bed Bath. Omit genitalia and soaking feet. Pat body dry; avoid vigorous rubbing. Apply alcohol to arms and back.

3. Watch patient for signs of chilliness, cyanosis; increased pulse rate.

Continue treatment for 20 minutes—unless patient shows reaction. In case of reaction, stop sponge; apply blankets and report reaction to ward nurse or doctor.

- 4. Remake bed; leave patient comfortable. Remove, clean, and store equipment.
- 5. Take TPR one-half hour after treatment is completed.

NOTE: When rapid reduction of very high temperature is desired, bath towels may be substituted for washcloths, thus covering a greater body area with each application. This method must be ordered by the doctor.

## PROCEDURES RELATING TO THE GASTROINTESTINAL TRACT

Review, Chapter II, "The Digestive System"

The treatments relating to the gastrointestinal tract are prescribed either to cleanse the area, to apply heat, to administer or remove fluids, or to administer medication. Most of these treatments require clean equipment and solutions except in the presence of gastric surgery when sterile equipment is needed. All equipment used in these treatments must be sterilized after each use and the returns from these treatments should be discarded down the hopper or bedpan flusher.

## INTUBATION

The introduction of tubes through the nose or mouth into the stomach is usually the responsibility of the doctor. However, there are times when a corpsman may be called upon to insert a tube or to teach his patient how to do so.

### PURPOSES:

To obtain a specimen of gastric contents for laboratory examination; to prepare the patient for a gastric lavage, gavage, or suction siphonage.

## Types of Gastric and Intestinal Tubes

Levin tube (fig. 106). This is a flexible, softwalled, No. 16 French, 4-foot tube. It has multiple holes near the rounded tip. Markings on the tube indicate distances of 50, 60, 70, and 80 centimeters. The Levin tube is used for gastric and intestinal drainage, gastric lavage and gavage. It may be inserted either nasally or orally. It is flexible enough so that there is little danger of producing injury. The chief danger is that the tube may readily enter the trachea.

Stomach tube (fig. 107). This is a stiff, heavy-walled, No. 28 French, 5-foot tube with a round tip and a funnel at the other end. The stomach tube is used for gastric lavage. It is stiff enough to be easily passed into the stomach of an unconscious or uncooperative patient. The chief danger is that the tube, due to its stiffness, may damage the larynx or perforate the stomach or esophagus if not carefully used.

Contor tube (fig. 108). This is a single lumen, No. 18 French, 10-foot intestinal tube with a small mercury-filled bag at its tip. It is used for intestinal drainage and to relieve intestinal obstruction. The tube is inserted nasally, suction is started when the letter "S" on the tube is at the patient's nose.

Miller-Abbott tube (fig. 109). This is a metal tipped, double lumen, No. 16 French, 10-foot intestinal tube with a small balloon near its tip.

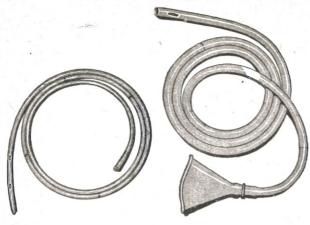


Figure 106.—Levin Tube.

Figure 107.—Stomach Tube.

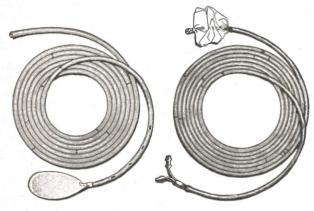


Figure 108.—Cantor Tube. Figure 109.—Miller-Abbott Tube.

One lumen of the tube is used to inflate the balloon; the other, entirely independent, for aspiration. Markings on the tube indicate the distance it has been passed. The tube is inserted nasally and suction is started when the first mark is at the patient's nose. Peristaltic action carries the balloon and tube along the intestine.

## Intubation Technique (Nasal)

### EQUIPMENT:

Levin tube in basin of ice water Water soluble lubricant 20 to 30 cc. syringe Bath towel Rubber sheet Paper mouth wipes Curved basin

#### PROCEDURE:

1. Place patient in Fowler's or sitting position. Explain procedure to him.

- 2. Secure bath towel around his neck. Place rubber sheet over bedding.
- 3. Remove tube from ice water. Lubricate tip very lightly.
  - 4. Ask patient to tilt head slightly backward.
- 5. Hold tube about 6 inches from its tip. Rotate it until position of greatest "droop" is found.
- 6. Holding tube in this position, pass it through the nostril into the pharynx. Ask the patient to tip his head forward and to swallow. Each time he swallows insert the tube a few inches. Do not use force. Continue inserting the tube until second marker on tube is reached.

CAUTION: Should patient start coughing, choking or become cyanotic; remove tube quickly. Allow patient to rest a few minutes. Re-insert tube

- 7. Attach syringe to tube and aspirate gastric contents.
  - 8. To remove tube:

Place towel close to patient's chin.

Pinch tube at patient's lips.

Gently but quickly remove tube and place it directly into towel.

## Suction Siphonage (Wangensteen)

### PURPOSE:

To provide constant drainage of the gastrointestinal tract. To relieve or prevent abdominal distention; to remove gas or fluids from gastrointestinal tract; to relieve intestinal obstruction; to relieve postoperative nausea or vomiting.

#### INDICATED:

When ordered by doctor.

## Types of Suction Apparatus

- 1. Three bottle method. With this method a partial vacuum is created in the drainage bottle by the flow of water from the top bottle to the bottom bottle.
- 2. Handpump method. With this method a partial vacuum is created in the drainage bottle by pumping some air out of the tank.

NOTE: Since the pressure in the drainage bottles of both types is lower than the pressure in the stomach, the stomach contents are siphoned into the drainage bottles.

## Three Bottle Method

#### **EQUIPMENT:**

## From the central dressing room:

Siphonage unit

Levin tube

Glass connecting tip

## From ward:

Lubricant for tube

Basin of cracked ice

Curved basin

Rubber sheet and cover

Adhesive strips (½" wide x 6" long—split halfway down the middle)

Safety pin

Elastic band

Large paper bag to cover drainage bottle

## PROCEDURE:

## Preparation of equipment:

- 1. Place Levin tube on ice.
- 2. Attach connecting tip to tubing of drainage bottle. Close clamp on tubing.
- 3. Invert center bottles, water will start flowing from top to bottom bottle.
- 4. Open clamp, test for suction by placing finger over opening. Close clamp.
  - 5. Take all equipment to bedside.

## Preparation of patient:

- 1. Screen and tell patient what is to be done. Levin tube is introduced. See Intubation Technique.
- 2. Attach Levin tube to connecting tip of drainage bottle. Open clamp.
- 3. Tape Levin tube to patient's forehead or cheek.
- 4. Loop elastic band about tubing near connecting tip, pin to bedding.
  - 5. Place drainage bottle in paper bag.

### During treatment:

- 1. Invert center bottles whenever top one is empty.
- 2. Measure and empty drainage bottle when it becomes two-thirds full or every 12 to 24 hours.

To empty drainage bottle:

Close clamps on tubing to center bottles and Levin tube.

Unscrew cap, remove bottle.

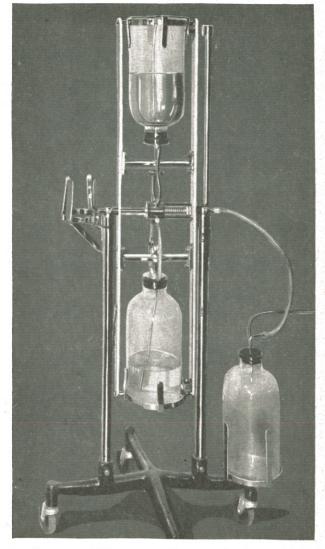


Figure 110.—Wangensteen Apparatus (three bottle).

Measure and note contents.

Rinse bottle with cold water, wash with soap and water.

- 3. Watch working order of apparatus; report any signs that siphonage is not working.
  - 4. Keep accurate intake and output records.
- 5. Give mouth care every 4 hours. (Patient may have chewing gum if ordered.)
- 6. Apply ointment or oil to each nostril every 4 hours.
- 7. Do not clamp tubing or stop siphonage unless ordered by doctor.
- 8. Give only clear fluids by mouth if ordered (water, tea, black coffee, broth, strained soups. No milk, solids).

- 9. Irrigate tube, if ordered (see Tube Irrigations).
- 10. Observe patient. Report any complaints of nose and throat irritation; any signs of blood in drainage.

### CARE OF EQUIPMENT:

- 1. Wash tubing, drainage bottle and cap. Boil 5 minutes. Replace on apparatus.
  - 2. Wash Levin tube, boil 5 minutes.
  - 3. Return borrowed equipment to CDR.
  - 4. Wash metalware, boil 20 minutes.
  - 5. Return equipment to proper places.

CAUTION: Do not disturb center bottle of apparatus.

## Charting—Nursing Notes

Time of starting treatment.

Patient's reaction to treatment.

Describe drainage—amount, color, odor, each time bottle is emptied.

## Hand Pump Method

### EQUIPMENT:

### From the central dressing room:

Hand pump apparatus

Gallon bottle

Two-hole rubber stopper

Two pieces 4-foot tubing

Connecting tip

#### From ward:

Same as for Three-Bottle Method.

## PROCEDURE:

### To connect apparatus:

- 1. Connect the two pieces of tubing to the rubber stopper.
- 2. Insert the rubber stopper into the gallon bottle. Be sure the stopper fits tightly.
- 3. Connect the free end of one piece of tubing to the gage on the tank.
- 4. Connect the other piece of tubing to the patient's tube.

## To start siphonage:

- 1. Open needle valve on tank by turning knurled knob in a counter-clockwise direction.
- 2. Create suction to tank by pumping approximately 40 to 50 strokes until the gage registers 5.

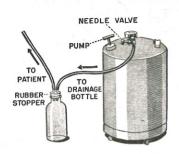


Figure 111.—Hand Pump Apparatus.

If the nasal tube is free from leaks, if the rubber stopper in the drainage bottle is free from leaks, if the tubing connecting the drainage bottle to the tank is free from leaks, this suction should be sufficient to last the average patient about 20 hours.

### Care of Patient

The care of the patient during treatment is similar to the Three-Bottle Method. Watch gage; dial should read 3 to 5 during treatment.

## Improvised (Wangensteen) Three-Bottle Method

#### EQUIPMENT:

Three gallon bottles

Three lengths rubber tubing—one (6 feet); one (4 feet); one (3 feet)

Two 2-hole rubber stoppers to fit bottles

Two clamps for tubing

Four lengths glass tubing—one (1 foot); two (3 inches); one (6 inches)

Bandage or tape for hanging bottle

One Levin tube

One connecting tip

One standard or other apparatus for hanging bottle

#### PROCEDURE:

## Preparation of equipment:

### In utility room:

- 1. Mark bottles for measuring fluids (see Simple Drainage).
- 2. Insert 1 long and 1 short glass tubing in each rubber stopper.
  - 3. Insert stoppers into 2 bottles.
  - 4. Set up suction apparatus (fig. 112).

Bottle No. 1. Fix bandage, or tape, to hang on hook. Fill to 4,000 cc. with water. Insert stopper with 1-foot glass tubing into bottle.

Attach 6-foot-length rubber tubing to short glass tube.

Bottle No. 2. Fill with water to 300 cc. Place rubber tubing from bottle No. 1 so that end is under water.

Bottle No. 3. Insert rubber stopper. Attach 4-foot tubing to long tube of bottle No. 1, attach 3-foot tubing to other glass tube.

Apply clamps. One to tubing from bottle No. 1 to No. 3, one to tubing from bottle No. 3 to Levin tube.

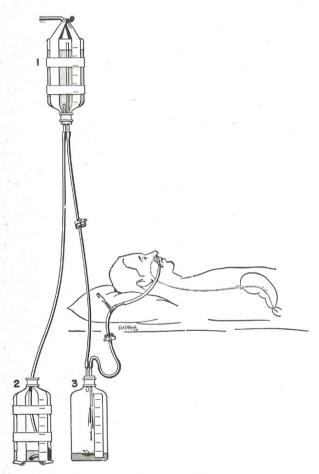


Figure 112.—Improvised Apparatus,

## At bedside:

- 1. Place bottles No. 2 and No. 3 on floor.
- 2. Be sure all clamps are closed.
- 3. Invert and hang bottle No. 1 on standard 2½ feet above bed level.

## Starting siphonage

1. Levin tube is introduced (see Intubation Technique).

- 2. Connect Levin tube to tube of drainage bottle No. 3.
- 3. Release clamp on tubing from bottle No. 1 to No. 3.
- 4. Release clamp on Levin tube to drainage bottle No. 3. Care of patient is same as for Three-Bottle Method.

## Tube Irrigations

### INDICATED:

When ordered by the doctor.

### **EQUIPMENT:**

Basin

Bulb syringe or 30 cc. Luer syringe

Curved basin

Small covered rubber sheet

#### Solution

Water or normal saline, 250 to 500 cc. at 100° F.

CAUTION: Solution and equipment must be sterile when used for a patient who has had gastric surgery.

#### PROCEDURE:

- 1. Clamp tubing to drainage bottle.
- 2. Place covered rubber sheet on bed under connector of Levin tube and drainage tube.
  - 3. Place curved basin under connector.
  - 4. Disconnect tubing.
- 5. Fill syringe, insert tip into Levin tube, gently inject solution.
- 6. Allow solution to drain out of tube into curved basin.
  - 7. Repeat steps 5 and 6 until all solution is used.
- 8. Connect Levin tube to drainage tube, unclamp tube.
  - 9. Remove equipment, measure returned fluid.

### Charting—Nursing Notes

Record amount and type of solution used; amount and description of returns.

## GASTRIC LAVAGE

### PURPOSE:

To empty stomach.

#### INDICATED:

When ordered by the doctor; as a preoperative preparation for gastric surgery; to remove poisons.

#### EQUIPMENT:

Tray containing—

Stomach tube in basin of ice water

Two-gallon pitcher of warm water (105° F.), or solution ordered by doctor

Large pail for returns

Rubber sheet and cover

Curved basin, paper wipes

### PROCEDURE:

## Preparation of patient and his unit:

- 1. Screen and tell patient what you are going to do.
  - 2. Place patient in Fowler's position.
- 3. Place covered rubber sheet over bedding and under patient's chin.
- 4. Give patient curved basin and paper wipes to hold.
  - 5. Place pail on floor or bench.
  - 6. Locate white marker on stomach tube.

## Conducting lavage:

- 1. Stomach tube is usually inserted by the doctor. The tube is placed far back in the mouth and as the patient swallows the tube is advanced a few inches each time until the marker is reached.
  - 2. Invert funnel, allow drainage.
- 3. Hold funnel upright, pour solution into funnel and keep full until approximately 500 cc. has been given.
- 4. Invert funnel while there is still some solution in it, allow to drain.
- 5. Repeat steps 3 and 4 until returns are clear or until amount ordered has been used. If patient becomes exhausted, stop lavage, report to doctor.
- 6. Pinch tube at patient's lips, withdraw quickly into curved basin.
- 7. Make patient comfortable, remove equipment, leave unit in order.

### Care of Equipment

- 1. Measure returns.
- Place linen in hamper.
- 3. Wash, boil tube 5 minutes.
- 4. Wash pail with soap and water, rubbing vigorously for 2 minutes.
  - 5. Wash and boil basin and pitcher 20 minutes.

## Charting—Nursing Notes

Time of gastric lavage, amount of solution used. Amount, appearance and odor of returns. Signature. NOTE: If Levin tube is used: Tube may be inserted through nose. Add 50 cc. syringe to equipment. Plunger of syringe may be used to start or reestablish drainage.

## GASTRIC GAVAGE

### PURPOSE:

To introduce liquid food or medication into the stomach by means of a tube.

### INDICATED:

When ordered by the doctor for patients who are unable to swallow; who are unconscious; who refuse to eat; who have spasm or stricture of the esophagus.

#### EQUIPMENT:

To equipment for Intubation Technique add: Fluid to be fed.

#### PROCEDURE:

- 1. Warm liquid food to body temperature.
- 2. Follow procedure for Intubation Technique, steps 1 through 6.
  - 3. Attach barrel of syringe to tube.
- 4. Slowly pour fluid down side of syringe. Keep syringe full of fluid until all has been given.
- 5. Pour 60 cc. of water into tube after fluid to clear tube.
- 6. To remove tube. Follow step 8 of Intubation Technique Procedure.

## Charting—Nursing Notes

Record: Time; amount and name of fluid; state whether tube was introduced orally or nasally. Signature.

## **ENEMAS**

## PURPOSE:

To remove feces from lower intestinal tract; to relieve flatulence and abdominal distention; to produce local or systemic effects.

## Cleansing Enema

#### PURPOSE:

To remove feces.

### Solutions

- 1. Soap suds solution (S.S.E.) (white soap) 500 to 1,000 cc.
- 2. Normal saline solution (N.S.) (1 teaspoon salt to 1 pint of water) 500 to 1,000 cc.
  - 3. Temperature of solution: 105 to 110° F.

## EQUIPMENT:

### Tray containing—

Irrigation can

Rubber tubing
Clamp
Glass connecting tip
Rectal tube No. 24 French
Lubricant (water soluble)
Curved basin
Toilet tissue
Tongue blade
Rubber sheet with cover
Covered bed pan and urinal

#### PROCEDURE:

#### Preparation of patient and unit:

- 1. Screen patient, explain procedure to him.
- 2. Clear the top of bedside locker.
- 3. Lower backrest and turn patient on left side or side most comfortable for him (Sims position). For patients who are paralyzed or unable to retain

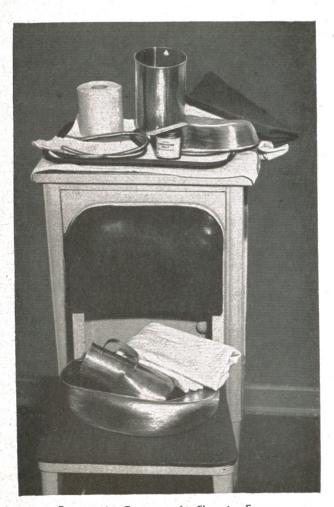


Figure 113.—Equipment for Cleansing Enema.

any fluids, place the patient on a bedpan before injecting fluid.

# Preparation of equipment:

- 1. Attach rectal tube to glass connecting tip; clamp tubing.
  - 2. Fill pitcher with solution—110° F.
- 3. Pour solution into irrigating can, allow solution to run through tubing, clamp.
- 4. Remove small amount of lubricant from jar with tongue blade and place on piece of toilet tissue.
- 5. Lubricate rectal tube, leave tissue around tube.
- 6. Cover bedpan, place tray on top of pan and carry to bedside. Carry urinal by handle.

# Administering fluid:

- 1. Place bedpan and urinal on chair, tray on bedside table.
- 2. Fold back upper bedding in triangle to expose anus.
- 3. Place covered rubber sheet under patient's buttocks.
  - 4. Place curved basin next to anus.

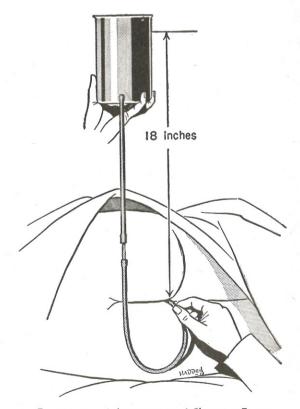


Figure 114.—Administration of Cleansing Enema.

- 5. Open clamp on tubing, allow small amount of solution to run through tube into curved basin.
- 6. Raise upper buttock, locate anus, insert rectal tube 3 to 4 inches, hold in place with left hand.
- 7. Open clamp with right hand, hold irrigating can approximately 18 inches above anus.
  - 8. Allow solution to flow slowly.
- 9. If patient complains of discomfort or cramps, pinch tubing for a few moments.
- 10. Continue flow until patient has taken all solution or as much as he is able.
- 11. Clamp tubing, place can on tray, disconnect rectal tube over curved basin.
- 12. Pinch and withdraw rectal tube, place in curved basin, remove basin.
  - 13. Place patient on bedpan; elevate backrest.
- 14. Place toilet tissue and call bell within his reach.
- 15. Carry tray to utility room. Wash your hands.
- 16. Leave patient alone until he calls, but look in on him frequently.
- 17. When patient is finished, remove and cover bedpan; assist patient with cleansing if necessary. If patient is unable to expel enema, insert rectal tube and siphon fluid into bedpan.
- 18. Take bedpan to utility room, inspect contents; note amount, odor, color and consistency, unusual appearance.
- 19. Take basin of water to patient to wash his hands.

# Care of Equipment

- 1. Rinse irrigating can and tubing with warm water.
- 2. Run cold water through rectal tube, wash with soap and water; rinse. (Use applicators if necessary to clean "eye" of tube.)
- 3. Boil irrigating can, curved basin, tubing, and rectal tube.
- 4. After boiling, immerse rubber goods in cold water, dry, hang up to drain.
  - 5. Scour metalware.
  - 6. Sponge off rubber sheet.
  - 7. Reset tray.

# Charting—Nursing Notes

Time.

Type of enema given.

Results.

Reaction of patient.

Signature.

# Carminative Enema

#### PURPOSE:

To relieve flatulence and abdominal distention.

#### Solutions

- 1. 1-2-3 enema. One ounce magnesium sulfate, 2 ounces glycerin, 3 ounces water.
  - 2. Milk and molasses—6 to 8 ounces of each.
- 3. Sodium bicarbonate—8 grams (2 teaspoonfuls) to 500 cc. hot water.
  - 4. Temperature of solution: 105° F.

#### **EQUIPMENT:**

Same as for Cleansing Enema except—

When small amount of solution is ordered (4 to 6 oz.) use Retention Enema equipment.

#### PROCEDURE:

Same as for Cleansing Enema except—

Urge patient to retain solution for 20 minutes if he is able.

# Charting—Nursing Notes

Same as for Cleansing Enema.

#### Retention Enema

# PURPOSE:

To produce a general systemic effect, such as a sedative; to give local remedial effect, to soften feces, to relieve irritation.

# Types

- 1. Oil enema—4–8 ounces of warm oil (mineral, olive, cottonseed).
- 2. Sedative—drug mixed with 2 to 3 ounces of water, oil, or cornstarch solution. Example: chloral hydrate, paraldehyde, sodium bromide, in dosage as ordered by the doctor.
- 3. Cornstarch—4 to 6 ounces water; dissolve enough starch to make smooth, white fluid. Temperature of solution 100° F.

#### **EQUIPMENT:**

Tray

Pitcher

Funnel

Rectal tube No. 20 French, or catheter

Lubricant

Tongue blade

Toilet tissue

Covered rubber sheet

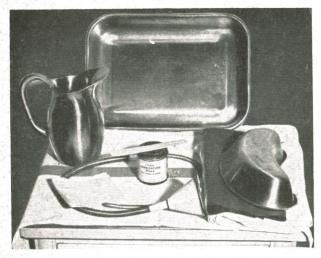


Figure 115.—Equipment for Retention Enema.

#### PROCEDURE:

#### Preparation of patient and unit:

- 1. Screen patient, tell him what you are going to do
  - 2. Clear top of bedside locker.
- 3. Turn patient on either side (most comfortable position for him).
- 4. Place covered rubber sheet under patient's buttock.

# Preparation of equipment:

- 1. Prepare solution ordered at correct temperature.
- 2. Put lubricant on toilet tissue and lubricate rectal tube.
- 3. Attach rectal tube to funnel. Place in curved basin.
  - 4. Take tray to bedside.

#### Administration of fluid:

- 1. Expose anal area by forming triangle of upper bedding. Place curved basin next to anus.
- 2. Fill funnel with solution, allow solution to flow through tube back into pitcher, pinch tubing before funnel is empty.
- 3. Holding funnel in one hand, raise upper buttock and insert rectal tube about 4 inches.
- 4. Raise funnel even with top of buttock. Allow solution to flow slowly to avoid stimulating bowel movement. If patient has difficulty retaining solution, apply gentle pressure with toilet tissue to rectum until desire to defecate has passed. Keep funnel full until all solution has been given.

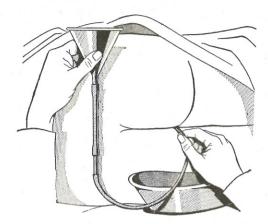


Figure 116.—Administration of Refention Enema.

- 5. Pinch tube—remove and place in curved basin—disconnect funnel and tube. Place basin on tray.
  - 6. Leave patient on his side, do not disturb him.
  - 7. Take equipment to utility room.

# Care of Equipment

Same as for Cleansing Enema.

# Charting—Nursing Notes

Record time, type and amount of solution. Whether or not solution was retained. Signature.

# COLOSTOMY IRRIGATION

#### PURPOSE:

To remove feces from the large intestine.

#### EQUIPMENT:

Same as for Cleansing Enema except—

- 1. Use smaller tube, Nos. 18 to 22 French catheter or rectal tube.
- 2. Normal saline or water, 500 to 750 cc. at 100° F.
  - 3. Add dressing tray and curved basin.

# Preparation and after care of equipment:

Same as for a Cleansing Enema.

#### PROCEDURE:

the colostomy.

- 1. Screen patient, tell him what you are going to do.
  - 2. Turn the patient on the side of his colostomy.
- 3. Place a covered rubber sheet on the bed under
- 4. Remove the dressing; place it in the curved basin.

- 5. Place the second curved basin under the colostomy opening.
- 6. Introduce lubricated catheter about 4 inches into the colostomy opening, hold the tube in place with the left hand.
- 7. Raise irrigating can 10 inches above the colostomy.
- 8. Allow solution to flow slowly until all has been given, then pinch and remove the tube.
- 9. Leave curved basin in place until return flow stops.

10. Open dressing tray, clean wound with soap solution, apply dressing.

NOTE: Be gentle and tactful with this patient, particularly if the colostomy is a recent one. He has to become accustomed to this new situation in which he has no control of his bowel movements and he has fears of possibly offending and embarrassing himself and others. Reassure and encourage him. The colostomy can be regulated in almost the same way as the rectum but it takes time, patience, attention to diet, and the complete cooperation of the patient and all personnel.

# PROCEDURES RELATING TO THE GENITOURINARY TRACT

Review—Chapter II, "The Excretory Systems"

"The Reproductive System"

Chapter VII, "Diuretics"

The treatments relating to the genitourinary tract are prescribed in order to cleanse the area, apply heat, to administer medications or to remove fluid. All treatments requiring the insertion of any instrument into the urinary bladder must be executed using aseptic technique. The corpsman is urged to obtain supervision when doing these treatments because of the danger of infection due to faulty aseptic technique or the danger of producing injury due to improper insertion of catheters.

The treatments discussed in this section are limited to those a corpsman would be likely to be called upon to do in a ward or sick bay. Other special genitourinary treatments are given in the G. U. clinic by the doctor or a trained technician.

Soap solution and sterile water are indicated for cleansing the external genitalia in these procedures. However, benzalkonium chloride 1:1,000 aqueous solution or detergent with 3% hexachlorophene or other solution may be preferred. Check local station instructions or with doctor.

# CATHETERIZATION

#### PURPOSE:

To remove urine from the bladder by means of a catheter introduced through the urethra.

#### INDICATED:

When ordered by the doctor: To relieve retention of urine; before certain operations; to collect a sterile specimen of urine.

#### EQUIPMENT:

#### Sterile:

One pair rubber gloves

One cup of soap solution

One cup of sterile water

Two catheters—Nos. 14, 16, or 18 French

One curved basin

Six gauze sponges or cotton balls

Two 4 x 4 gauze flats

One sterile towel

One forceps or hemostat

One specimen bottle

One culture tube

#### Unsterile:

One small rubber sheet and cover

One curved basin

One urinal

# PROCEDURE:

#### In utility room:

- 1. Wash your hands.
- 2. Open sterile tray.

- 3. Fill solution cups.
- 4. Place small amount of lubricating jelly on a 4 x 4 gauze flat.
- 5. Cover tray, take to be side with the rest of the equipment.

#### Male Patient

# At bedside:

- 71. Screen patient and tell him what you are going to do. Ask him to place his hands under his head and keep them there. Position—dorsal recumbent.
- 2. Fan-fold top bedding to patient's knees. Cover his chest with an extra sheet if ward is cool.
- 3. Place covered rubber sheet over thighs and under penis.
  - 4. Place unsterile basin on covered rubber sheet.
  - 5. Place tray on bedside locker. Open tray.
- 6. Hold penis just back of head of penis, retract foreskin if possible.
- 7. Scrub the head of the penis with three soap solution cotton balls and discard cotton balls into unsterile basin.
- 8. With forceps, remove soap with three sterile water cotton balls.
- 9. Remove unsterile basin. Open sterile towel, place on rubber sheet, place cleansed penis on sterile towel.
  - 10. Put on sterile rubber gloves.
  - 11. Place sterile curved basin on towel.
- 12. Pick up catheter, lubricate tip with jelly, hold other end between third and fourth finger.
  - 13. Hold penis at 60° angle, with other hand.
- 14. Insert catheter until resistance is felt, apply steady, gentle pressure, lower penis and continue

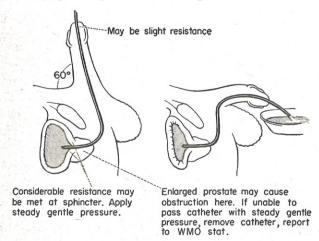


Figure 117.—Insertion of Catheter.

- insertion until urine begins to flow, place end of catheter in sterile basin,
- 15. If specimen is to be obtained, collect 120 cc. in specimen bottle. If urine culture has been ordered, collect specimen in culture tube.
- 16. When urine ceases to flow, pinch catheter and remove it quickly and gently.
- 17. Leave patient dry, covered, and comfortable.
- 18. Remove equipment. Measure amount, note color, appearance and odor of urine.
- 19. Cover sterile specimen with sterile 4 x 4's held in place by elastic band.
  - 20. Clean, sterilize, and store equipment.

#### Female Patient

Purpose, equipment, and preparation of equipment, same as for Male Patient. To equipment add 1 sheet and drop light.

#### PROCEDURE:

#### At bedside:

1. Screen patient, tell her what you are going to do.

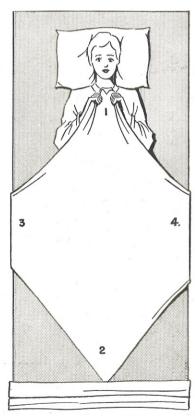


Figure 118.—Draping the Patient.

- 2. Drape sheet diagonally over patient. Fanfold bedding to foot of bed.
- 3. Draping: Fold back corner (2) to groin. Wrap corners (3) and (4) around patient's right and left feet, leaving the genital area exposed.
- 4. Place a covered rubber sheet under patient's buttocks.
- 5. Place tray on bed between patient's legs, unsterile basin to one side of tray, place droplight to give best light.
- 6. Open tray, fold back tray cover to patient's buttocks.
  - 7. Put on sterile gloves.
- 8. Separate labia, with left hand. Pick up forceps in right hand.
- 9. Cleanse labia, urinary meatus, perineum with cotton balls of soap solution. Follow with sterile water. Use each cotton ball once, always wiping from labia to perineum and off. Discard cotton into unsterile basin.
  - 10. Place sterile basin close to buttocks.
- 11. Pick up catheter, lubricate tip, hold other end of catheter between third and fourth fingers.
- 12. With other hand separate labia, locate meatus.
- 13. Insert catheter gently until urine begins to flow (1½ to 2 inches). Place end of catheter in basin.

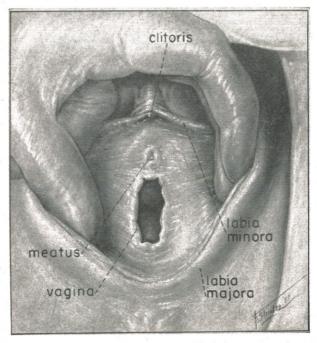


Figure 119.—Female Genitalia.

- 14. If specimen is to be obtained, collect about 120 cc. directly into specimen bottle. If urine culture has been ordered, collect specimen in culture tube.
- 15. Pinch and remove catheter when urine flow stops.
- 16. Leave patient dry, covered, and comfortable.
  - 17. Clean, sterilize, and store equipment.

#### Bladder Instillation

#### PURPOSE:

To treat the bladder with an antiseptic solution.

#### EQUIPMENT:

Catheterization tray, plus— Medication in sterile container Sterile syringe barrel

#### PROCEDURE:

- 1. Follow procedure for Catheterization through to removal of urine.
  - 2. Attach syringe to catheter.
  - 3. Pour medication into syringe.
- 4. When all medication has passed through catheter, pinch and remove catheter.
  - Proceed as in Catheterization.

# Charting—Nursing Notes

Record: Time; treatment; amount, color, appearance, and odor of urine obtained; complaints of patient—if specimen was obtained. If bladder instillation was performed—state name, strength and amount of solution instilled. Signature.

#### Indwelling or Retention Catheter

The doctor inserts a retention catheter. The corpsman is responsible for the preparation of the patient and equipment and for keeping a record of intake and output.

#### PURPOSE:

To provide constant drainage of urinary bladder.

#### INDICATED:

When ordered by doctor for patient; following surgery when patient is incontinent of urine, or is having difficulty in voiding.

#### Types of Catheters Used

Mushroom.—The mushroom catheter has a small bulb near the tip. The catheter is stretched over

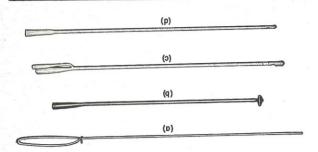


Figure 120a.—Catheter Director; b—Mushroom Catheter; c—Foley Catheter; d—French Catheter.

a metal director and inserted. When director is removed, small bulb reforms in bladder, holding catheter in place.

Foley.—The Foley catheter is a double lumen catheter; one opening is for drainage, other opening is to small balloon at tip of catheter which is inflated with 4 cc. sterile water after it is inserted into bladder. Screw clamp is then applied to this opening and is not released until catheter is to be removed.

French.—A French catheter is a straight catheter. It is fastened by placing adhesive tape along one side of the shaft of the penis, wrapped about the catheter, and fastened on the other side of the penis. Two strips of adhesive are then placed around the shaft of the penis in the manner illustrated (fig. 121).

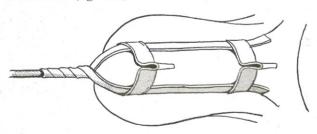


Figure 121.—Retention Catheter in Place.

#### EQUIPMENT:

All-equipment for catheterization, plus—

For Foley catheter:

Sterile catheter

Sterile solution basin

Sterile water

Sterile 10 cc. syringe

Screw clamp

For Mushroom catheter:

Sterile catheter

Sterile metal director

Sterile drainage tubing and connecting tip

Gallon drainage bottle Rubber band and safety pin Adhesive tape Bandage

#### PROCEDURE:

- 1. Follow procedure for Catheterization.
- 2. Connect catheter to drainage tube (see Simple Drainage).

# BLADDER IRRIGATION

#### PURPOSE:

To wash out the urinary bladder.

#### INDICATED:

When ordered by the doctor to cleanse the area of sediment, bacteria and their products, pus and excess mucus; to relieve inflammation; to control bleeding.

Method I—Intermittent Irrigation

#### **EQUIPMENT:**

Sterile pitcher Glass funnel or Asepto syringe barrel 250 to 400 cc. sterile solution at 100° F.

Curved basin

#### PROCEDURE:

- 1. Attach funnel to catheter.
- 2. Place curved basin under funnel connection.
- 3. Pour solution slowly along the side of the funnel until 75 to 100 cc. have been given.
- 4. Invert the funnel and allow solution to drain into curved basin.
- 5. Repeat steps 3 and 4 until all solution has been used.
- 6. If catheter is to be removed, follow catheterization procedure; if retention catheter is in place, reconnect with drainage tubing.
- 7. Measure and chart returns of irrigation. Color? Mucus? Pus? Bloody? Cloudy? What was the effect on the patient?

Method II—Continuous Irrigation

#### **EQUIPMENT:**

#### Sterile:

1.000 cc. solution in sterile bottle

Rubber tubing, one 4-foot length, one 2-foot length, and one 1½-foot length

Connecting tips, one Y tube, one straight tube

Two-hole rubber stopper with 2 short pieces of glass tubing

Drip regulator Airway needle

## Unsterile:

Standard

Elastic band, safety pin, and 2 clamps

### PROCEDURE:

#### Preparation of equipment:

- 1. Insert two-hole stopper into gallon bottle.
- 2. Place one clamp on 1½-foot tubing. Close clamp.

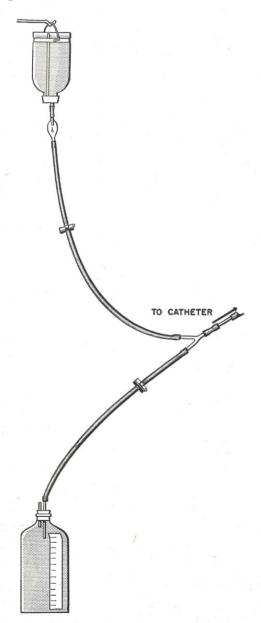


Figure 122.—Bladder Irrigation.

- 3. Insert drip regulator into solution bottle. Attach 4-foot tubing to regulator and to one prong of Y tube.
- 4. Connect 2-foot rubber tubing to drainage bottle and other prong of Y tube.
  - 5. Connect 1½-foot tubing to straight of Y tube.
- 6. Hang bottle on standard. Release clamp on 4-foot tube. Allow solution to run through tubing until all air is removed. Close clamp.

# Irrigating procedure:

- 1. Explain procedure to the patient.
- 2. Attach 1½-foot tubing to patient's catheter with straight connecting tip. Open clamp, allow urine to flow into drainage bottle.
- 3. Loop elastic band around Y tube and pin to patient's drawsheet.
- 4. Open clamp on 4-foot tubing to permit a flow of 40–60 drops a minute or at a rate ordered by the doctor.

NOTE: For intermittent irrigation.—Pinch off outflow tube (2-foot tube), release clamp on inflow tube (4-foot tube), allow 50–100 cc. (doctor's order) to flow into bladder. Close clamp. Release outflow tube. This step is repeated as ordered by the doctor. With the doctor's permission, the patient may be taught to do it himself.

# TIDAL DRAINAGE (MODIFIED LINDSEY)

#### PURPOSE:

To promote muscle tone in the urinary bladder through the alternate filling and emptying of the bladder.

To remove irritating products of inflammation and urine decomposition by continuous or frequent irrigation.

#### General Information

The height the tube assembly is placed above the symphysis of the patient determines the amount of pressure that will be attained within the patient's bladder. If the patient becomes distended or complains of pain before drainage starts, the assembly is too high; if the bladder is being emptied too frequently, the assembly is too low on the standard. When the pressure within the patient's bladder and within the test tube assembly are equal, the small test tube will float, causing the syphon to start and the bladder to drain. When the bladder is drained the small test tube comes to rest and the cycle is repeated.

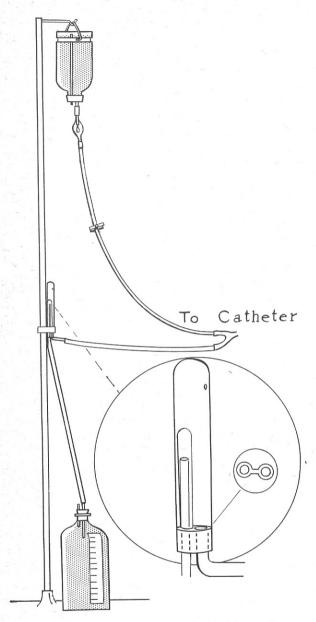


Figure 123.—Tidal Drainage (Modified Lindsey).

#### EQUIPMENT:

All equipment listed for Method II of Bladder Irrigation, plus the following which may be assembled and autoclaved by CSR:

Test tube 13 x 120 mm.

Test tube 25 x 150 mm.

L-shaped glass tubing 6-mm. bore

Straight glass tubing 6-mm. bore

Two-hole rubber stopper No. 5

Rubber tubing, 2-foot

Adhesive

# Preparation of equipment in CSR:

- 1. Cut a groove—½ inch wide by ½ inch deep—connecting the two holes in the underside of the rubber stopper. (See fig. 123.)
- 2. Insert straight glass tubing through stopper for 2½ inches. Insert L glass tubing through stopper so that it is flush with the surface of the stopper.
- 3. Place small test tube over straight glass tubing.
- 4. Make a small hole near the base of the large test tube.
- 5. Insert the stopper assembly into the large test tube. Autoclave.

# Preparation of equipment on ward:

Equipment is assembled the same as for Method II except:

1. Drainage bottle is connected to the straight glass tubing of the Lindsey set.

#### PROCEDURE:

- 1. Tape Lindsey set to standard at such a height that the top of the small test tube is about 2 inches above the symphysis of the patient. Clamp tube to catheter.
- 2. Allow solution to flow through tubing until all air is removed. Clamp tubes.
- 3. After patient has been catheterized, attach catheter to tubing. Release clamps; regulate drops at prescribed rate.
- 4. Compute and record output every 12 hours by subtracting the amount of solution used from the total drainage.

#### CAUTION:

- 1. All connections must be handled without contamination.
  - 2. Solution bottle must be kept filled.
- 3. Control the speed of inflow by adjusting the screw clamp on inflow tube.
  - 4. Keep accurate intake and output records.
- 5. If Kelly flask is used for solution, the top must be kept covered with sterile 4 x 4's.

# Charting—Nursing Notes

Time treatment started.

Total drainage, amount, name, strength of solution used, patient's output every 12 hours.

Description of the returns.

Patient's reaction to treatment.

Signature.

# SIMPLE DRAINAGE

#### PURPOSE:

To provide for removal of fluids from wound or body cavity.

#### INDICATED:

When drainage is desired from wound, from urinary bladder, or from other body cavity.

#### EQUIPMENT:

Gallon bottle, 2-inch adhesive tape, and ink or colored pencil for marking bottle

Glass connecting tip

Rubber tubing, 3-foot length

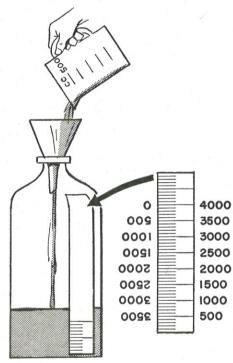


Figure 124.—Marking the Measurement of a Bottle.

Safety pin Elastic band Two-inch bandage Graduate

#### PROCEDURE:

### Preparation of equipment:

1. Provide for measuring fluid—

Place adhesive tape on side of bottle.

Pour 500 cc. water into bottle. Mark water level with ink or colored pencil.

Continue step 2 until 4,000 cc. is reached and marked.

Divide each space between marks evenly with four short lines. Bottle is now graded at 100 cc. levels. Empty bottle.

2. Attach connecting tip to tubing; place other end of tubing in bottle.

# Preparation of patient:

- 1. Attach connecting tip to catheter from wound or bladder.
  - 2. Tie drainage bottle to lower bar of bed at side.
- 3. Loop rubber band around rubber tubing, pin to bedding. Rubber tubing should be long enough to allow patient to move freely in bed.

# During treatment:

- 1. Watch drainage, check amount, color, appearance, and odor.
  - 2. Empty drainage bottle every 24 hours:

Measure and record amount.

Wash bottle with cold water, warm soapy water, rinse and dry.

#### Care of Equipment

- 1. Wash and boil equipment.
- 2. Return equipment to proper place.

# PROCEDURES RELATING TO THE EYE, EAR, NOSE, AND THROAT

Review—Chapter II, "The Respiratory System"

"Special Senses"

Treatments of the eye, ear, nose, and throat are usually given to administer heat or cold to the area (compresses); wash away discharges (irrigations); or to apply medication (drops).

The treatments of the eye which involve direct application to the eye itself require surgical aseptic (sterile) technique. Other procedures are clean treatments.

The corpsman should be very gentle when performing these treatments for his patients. Carelessness of the corpsman may result in blindness, deafness, or severe infection to the patient.

Charting of eye, ear, nose, and throat treatments.— Time treatment was given; name of the part treated; amount, name, strength, and temperature of the solution used; the results of the treatment; if irrigation, describe the returns; the reactions of the patient to the treatment. Signature.

#### EYE TREATMENTS

# Instillation of Eye Drops

# PURPOSE:

To relieve pain; to prepare for examination; to anesthetize preoperatively.

# EQUIPMENT:

Sterile medicine dropper in tube

Fresh medication specially prepared for use in eye

Clean basin containing sterile water, normal saline, or boric acid solution 2 percent at 100° F. to cleanse eyelids of discharges

Clean cotton balls

Curved basin

Paper wipes

# CAUTION:

- 1. Use only fresh, sterile medication specially prepared for eye use. Check dates on labels of eye medications.
  - 2. Read medication label three times.
  - 3. Use sterile medicine dropper.
  - 4. Do not use dry cotton on eye.
  - 5. Wash your hands before all treatments.

NOTE: When no discharge is present, cleansing equipment and step 1 of the Procedure (below) may be omitted.

#### PROCEDURE:

- 1. Moisten cotton ball, cleanse discharge from lids. Wipe from inner to outer side—use new cotton ball for each stroke.
- 2. Draw medication up into dropper, hold dropper upright so medicine does not enter bulb.
- 3. With dropper in one hand, take paper wipe in other and gently draw down lower lid by placing first two fingers on cheek.
  - 4. Ask patient to look up.

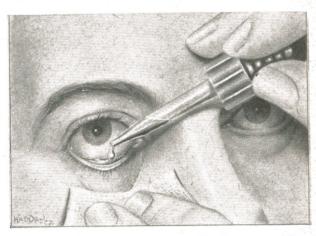


Figure 125.—Instillation of Eye Drops.

- 5. Drop prescribed number of drops into pocket formed by lower lid. Hold dropper parallel to eye. Rest your hand on patient's forehead.
- 6. Have patient gently close eyes; hold wipe at inner corner of eye.

# Application of Eye Ointment

#### PURPOSE:

To treat infection; to dilate or contract pupil; to lubricate eye.

# CAUTION:

- 1. Use only ointment specially prepared for eyes.
  - 2. Hold ointment tube parallel to eye.



Figure 126.—Application of Ointment to Eye.

#### PROCEDURE:

- 1. Draw down lower lid by placing first two fingers on cheek.
  - 2. Apply ointment along rim of lower lid.
  - 3. Have patient close eyes.
  - 4. Massage only if ordered.

#### Eye Irrigation

#### PURPOSE:

To remove discharges; provide moist heat; remove foreign body.

# EQUIPMENT:

Sterile. Tray with following-

Solution basin

Solution 105° F. (may be water, normal saline, boric acid 2 percent) 30 to 90 cc.

30 cc. Asepto syringe or medicine dropper

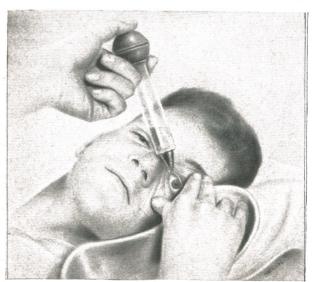


Figure 127.—Eye Irrigation.

Clean. For cleansing eye lids-

Cotton balls

Basin of water

Curved basin

Face towel

CAUTION: When both eyes are affected, use separate equipment for each eye, wash hands thoroughly between treatments of eyes.

#### PROCEDURE:

- 1. Place towel over shoulders, curved basin close to eye to be treated.
- 2. With moistened cotton ball, cleanse discharge from eye.
  - 3. Fill Asepto syringe, expel air.
- 4. Separate eye lids, direct flow from inner to outer canthus. Use only sufficient force to cause continuous flow of solution.
- 5. Continue steps 3 and 4 until all solution is used.
- 6. Wipe cheek with towel.

# Eye Compresses

See Applications of Heat and Cold.

#### EAR TREATMENTS

# Instillation of Ear Drops

# PURPOSE:

To soften wax; to relieve pain; to shrink foreign body.

# EQUIPMENT:

Clean medicine dropper Bottle of medication in basin of warm water Cotton applicators

Paper bag for waste

#### CAUTION:

- 1. Solution must be warm.
- 2. Do not use force in cleansing ear.

#### PROCEDURE:

- 1. Turn patient on his side with ear to be treated uppermost.
- 2. Cleanse outer ear and entrance to canal with applicator.
  - 3. Draw warm medication up into dropper.
  - 4. Instill number of drops ordered.
- 5. Have patient remain in position for 15 minutes.

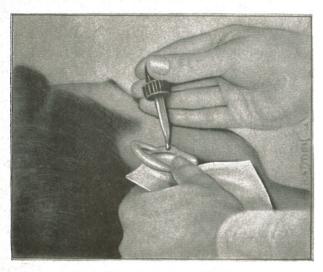


Figure 128.—Instillation of Ear Drops.

6. Do not place cotton in ears unless ordered. When ordered, place piece loosely in outer ear.

# Ear Irrigation

# PURPOSE:

To apply moist heat; to wash out discharges.

# EQUIPMENT:

Tray containing-

Rubber ear syringe or 1 ounce Asepto syringe

Curved basin

Basin of solution

Solution may be water, normal saline or boric acid solution (250 cc. at 105° F.)

Rubber sheet and cover

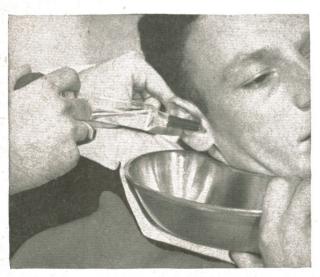


Figure 129.—Ear Irrigation.

#### PROCEDURE:

- 1. Drape covered rubber sheet over patient's shoulder.
- 2. Place curved basin under ear, have patient hold it if he is able.
  - 3. Cleanse discharge from ear.
- 4. Fill syringe, press bulb until solution appears at tip of syringe.
  - 5. Tilt patient's head over basin.
- 6. Straighten ear canal. Adult—draw ear up and back; child—draw ear down and back.
- 7. Direct flow toward side of canal; use only enough force to produce a steady stream.
  - 8 Use all solution. Dry ear when finished.

# NASAL TREATMENTS

# Instillation of Nose Drops

#### PURPOSE:

To relieve inflammation and congestion of nasal passages.

#### **EQUIPMENT:**

Medicine dropper

Solution

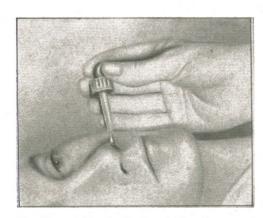


Figure 130.—Instillation of Nose Drops.

# PROCEDURE:

- 1. Place patient in a sitting position with head back, or lying flat in bed, a pillow under shoulders and head tipped to the side.
  - 2. Instill number of drops ordered.
  - 3. Have patient hold position for 5 minutes.

#### Nasal Spray

#### EQUIPMENT:

Atomizer with solution ordered

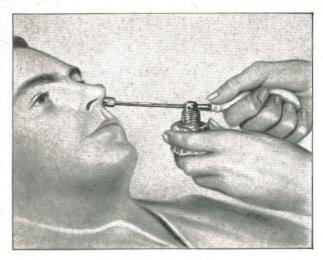


Figure 131.—Nasal Spray.

#### PROCEDURE:

- 1. Remove air from atomizer by squeezing bulb until spray is visible.
- 2. Tell patient to inhale while spray is being applied. Hold atomizer so that nasal tip is at nostril.
  - 3. Spray each nostril.

# THROAT TREATMENTS

#### Throat Spray

Same as for Nasal Spray except nasal tip is removed.

#### Throat Irrigation

Throat irrigation to be effective depends upon heat of solution, direction of solution to affected

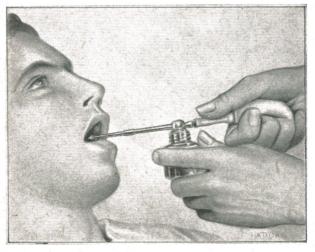


Figure 132.—Throat Spray.



Figure 133.—Throat Irrigation.

part and mechanical washing by the solution. For these reasons the patient should hold the irrigating tip and direct the flow. The solution should be as hot as he is able to take it unless a specific temperature is ordered by the doctor.

#### PURPOSE:

To relieve inflammation; to remove secretion; to apply moist heat to mucous membranes of throat.

## EQUIPMENT:

Tray with-

Irrigating can, with 3-foot tubing

Glass connecting tip

Stopcock

Rubber tubing, 6 inches

Basin

Towel

Pitcher of water, normal saline or 2 percent soda bicarbonate solution at 110° to 115° F.

Rubber sheet

Paper wipes

Curved basin

#### Preparation of patient and equipment:

- 1. Place patient in sitting position or turned on his side.
- 2. Place covered rubber sheet over chest and pin around his neck. (Pin through cover.)
  - 3. Place basin in front of patient.
- 4. Connect irrigating can tubing to glass and 6 inch rubber tip. Close stopcock.
  - 5. Fill irrigating can with solution. Open

clamp, allow small amount of solution to run through tubing; clamp.

6. Instruct patient to hold head to one side, to breathe through his nose, to direct flow toward painful areas, to take frequent rest periods and not to swallow while solution is flowing.

#### PROCEDURE:

- 1. Give patient irrigating tip.
- 2. Raise can to 12 inches above patient's mouth, open clamp.
- 3. Watch patient, pinch tubing when he stops to rest.
- 4. When all solution is used—disconnect tubing at glass tip.
  - 5. Place tip in curved basin.
- 6. Remove all equipment, leave patient clean and comfortable.

# References and Suggested Additional Reading— Unit III

Eliason, E. L., Ferguson, L. K. and Sholtis, L. A.: Surgical Nursing. 10th ed. Philadelphia, J. B. Lippincott Co., 1955.

Lowsley, O. S. and Kirwin, T. J.: *Urology for Nurses*. 2d ed. Philadelphia, J. B. Lippincott Co., 1948.

Harmer, B. and Henderson, V.: Textbook of the Principles and Practice of Nursing. 5th ed. New York, The Macmillan Co., 1955. Parts III and IV.

McClain, E. and Gragg, S.: Scientific Principles in Nursing. 3d ed. St. Louis, C. V. Mosby Co., 1958. Units III, V, VI.

Muller, G. L. and Dawes, D. E.: *Introduction to Medical Sciences*. 4th ed. Philadelphia, W. B. Saunders Co., 1958.

Oxygen Therapy Handbook. Linde Air Products Co., 1943, 1957.

Rapier, D. K., Koch, M. J., Moran, L. P., Fleming, V. L., Cady Jr., E. L. and Jensen, D. (Ed): *Practical Nursing*. St. Louis, C. V. Mosby Co., 1958. Unit IV, Parts II and III.

Young, H., Lee, E. and Associates: *Essentials* of *Nursing*. 3d ed. New York, G. P. Putnam's Sons, 1953. Pp. 189–433.

Check current issues of periodicals for information on new tests and treatments. Periodicals available at most stations:

Armed Forces Medical Journal. American Journal of Nursing.

# ADAPTATIONS OF NURSING CARE—UNIT IV

Nursing care of the patient is a personalized service. The quality of care given by the corpsman depends upon his ability to recognize the patient's needs and to call upon his previous knowledge in adapting his care to fit the needs of the patient.

The preceding units have considered the supportive measures, the diagnostic and therapeutic procedures which may be utilized in providing patient care.

This unit will discuss the adaptations and additional measures the patient may require.

In adapting nursing care remember:

1. A patient with a disease or condition is being cared for rather than a disease entity.

2. The nursing care of a patient is adapted according to the way the patient is affected by this disease or condition.

All of the procedures in this chapter have been concerned primarily with the individual patient and how to use the various types of equipment for his benefit. As the corpsman adapts his care it is suggested that he also consider:

How would I improvise, if the equipment was not available?

How would my adaptation be changed by a sudden influx of patients due to an emergency?

What procedures could be reduced or eliminated entirely during an emergency without endangering the patient?

# CARE OF THE PATIENT ON THE MEDICAL SERVICE

Review—Unit II, Basic Nursing Care; Unit III, Diagnostic and Therapeutic Procedures
Chapter V, Food in Health and Disease
Chapter VI, Communicable Disease
The Body's Defense Against Disease

Chapter VII, Review sections pertinent to medication prescribed patient

Patients on the medical service are those whose conditions are treated by medication and treatments other than surgical intervention.

The adaptation of nursing care to fit the needs of the patient on the medical service will be governed by the patient's condition and the treatment prescribed by the doctor. The patient's treatment may consist of either complete bed rest, a special diet, a specific medication or treatment, or combination of these methods.

In the care of the patient on the medical service, the corpsman should know:

1. How to give basic nursing care with particular emphasis on:

Keeping the patient clean and comfortable. Protecting the patient and others from infection.

- 2. How to assist with diagnostic and therapeutic tests and examinations.
- 3. How much and why the patient's activities are limited.

- 4. Why a specific diet is prescribed. What foods are to be included or excluded.
- 5. Why a particular medication or treatment has been ordered. What desired effects are to be expected; what untoward effects he should be alert to observe.
- 6. What pertinent observations should be made for the patient with a particular diagnosis.

The patient with diabetes and the patient with a cardiac condition are discussed to illustrate how procedures may be utilized in adapting nursing care and the observations to be made. The care of patients with other diseases may be planned following a similar pattern.

# THE PATIENT WITH DIABETES

Diabetes is a metabolic disorder probably due to a deficiency of insulin production by the islet cells of the pancreas. The treatment of the diabetic patient consists of the control of the condition by diet therapy and insulin administration. The corpsman's duties in the care of the patient with diabetes are:

- 1. Basic nursing care with emphasis on personal cleanliness and preventing the spread of infection.
  - 2. Attention to diet.
  - 3. Laboratory tests.
  - 4. Administration of insulin.
- 5. Close observation of the patient to prevent insulin shock or diabetic coma.

#### Insulin Shock

Insulin shock is due to too little food or overdose of insulin.

# Symptoms

Weakness, pallor, profuse perspiration, hunger, dizziness, apprehension.

Nervousness and tremor. Convulsions and coma, if untreated.

# Treatment

Give sugar in some form such as orange juice, sugar cubes, candy.

Notify doctor.

Apply blankets.

Prepare equipment for an intravenous injection of 50 percent glucose by the doctor if the patient is unconscious.

#### Impending Diabetic Coma

Diabetic coma is due to too much food or too little insulin.

### Symptoms

Loss of appetite, nausea and vomiting, listlessness and drowsiness, headache.

Sugar, acetone and diacetic acid in urine.

Sweet or "fruity" odor to breath.

# Treatment

Notify doctor at once.

Give regular insulin as ordered.

Prepare equipment for an intravenous injection of regular insulin by doctor if patient is unconscious.

# Teaching the Patient

The patient with diabetes will have to learn to live with his condition. His life can be a normal one with adjustments on his part in the matter of personal hygiene, diet, rest, exercise, and insulin administration. The corpsman can help his patient accept these limitations by:

Encouraging the patient to stay on his prescribed diet.

Stressing the importance of personal hygiene with special emphasis on the care of the skin, teeth, and feet.

Teaching the patient how to:

Administer insulin to himself.

Test his urine for sugar.

Recognize the early symptoms of insulin shock and diabetic coma and what treatment to institute.

# THE PATIENT WITH A CARDIAC CONDITION

The following are items of care needed by patients with cardiac conditions. The treatment of the patient with a specific cardiac condition will be ordered by the doctor.

The treatment of the patient usually consists of complete bed rest, supportive care, and administration of medication.

The corpsman's duties in the care of the patient are:

1. Complete bed rest for the patient.

Assist patient with oral hygiene.

Bathe the patient.

Feed the patient.

Keep the patient comfortable.

Assist the patient with the bedpan or urinal.

Allay fears and anxieties by prompt and cheerful service. The patient must be saved from even thinking for himself.

- 2. Attention to diet.
- 3. Regulation of fluids as prescribed. Measure and record intake and output.
- 4. Administration of medicines. Follow directions accurately.
  - 5. Close observation of the patient.

Edema—may appear in buttocks, legs, and ankles.

Dyspnea—support the patient in the position he finds most favorable.

Pulse—note the rate, force, rhythm and volume when taking a pulse. Count for a full minute.

Cyanosis—may appear about the lips, fingernails or buttocks. Oxygen may be ordered.

Pressure sores may develop.

#### CAUTION

In administering digitalis.—Keep an accurate record of total dosage. Take the patient's pulse before giving drug. Report a pulse rate below 60 a minute and do not give digitalis in this instance unless specifically instructed. Watch for symptoms of nausea and vomiting.

Drugs such as opiates, sedatives, and diuretics may be prescribed. Carefully observe and record effects.

# Teaching the Patient

The patient will have to learn to live within the limitations set by his condition. The corpsman can help his patient by—

Encouraging the patient to accept these limitations.

Showing him the importance of rest and moderation in all activities.

Teaching him the importance of avoiding over-exciting stories, movies, and company.

Teaching the need of carrying and knowing how to use the medications prescribed by the doctor.

# THE PATIENT WITH A COMMUNICABLE DISEASE

There may be patients in a sick bay or hospital ward who are carriers of disease or whose communicable diseases are hidden by other conditions. Many communicable diseases start with symptoms of a common cold, sore throat, or gastrointestinal upset. When any patient presents these symptoms, place him on strict bed rest and use concurrent disinfection of equipment as precautionary measures until a diagnosis is established.

The care of a patient with a communicable disease is essentially the same as for any patient with the addition of medical aseptic techniques.

The extent of medical aseptic techniques required for a patient with a communicable disease will depend upon how the infectious organism is transported or the modes of transmission, the source of infection, and the period of communicability of the disease.

#### Modes of Transmission

Modes of transmission are the mechanisms by which an infectious agent is transported from reservoir to susceptible human host. They are:

#### 1. Contact:

- (a) Direct contact: Actual touching of the infected person or animal or other reservoir of infection as in kissing, sexual intercourse, or other contiguous personal association.
- (b) Indirect contact: Touching of contaminated objects such as toys, handkerchiefs, soiled clothing, bedding, surgical instruments and dressings, with subsequent hand to mouth transfer; less commonly, transfer to abraded or intact skin or mucous membrane.
- (c) Droplet spread: Spray expelled from an infected person during sneezing, coughing, singing or talking. Such droplets usually travel not more than 3 feet from the source. Transmission by droplet infection is considered a form of contact infection, since it involves reasonably close association between two or more persons.
- 2. Vehicle: Water, food, milk, biologic products to include serum and plasma, or any substance or article serving as an intermediate means by which the infectious agent is transported from a reservoir and introduced into a susceptible host through ingestion, through inoculation or by deposit on skin or mucous membrane.
- 3. Vector: Arthropods or other invertebrates which transmit infection by inoculation into or through the skin or mucous membrane by biting, or by deposit of infective materials on the skin or on food or other objects. The vector may be infected itself or may act only as a passive or mechanical carrier of the agent.

# 4. Air-borne:

- (a) Droplet nuclei: The inhalation of the small residues which result from evaporation of droplets (see 1 (c) above) and remain suspended in air of enclosed spaces for relatively long periods of time. Droplet nuclei also may be created purposely by a variety of atomizing devices, or accidentally in the course of many laboratory procedures.
- (b) Dust: The inhalation or settling on body surfaces of coarser particles which may arise from contaminated floors, clothes, bedding, or soil, and ordinarily remain suspended in the air for relatively short periods of time.

#### Source of Infection

A source of infection is the thing, person, object or substance from which an infectious agent passes immediately to a host. Transfer is often direct from reservoir to host in which case the reservoir is also the source of infection (measles). The source may be at any point in the chain of transmission, as a vehicle, vector, intermediate animal host or fomite; thus, contaminated water (typhoid), an infective mosquito (yellow fever), beef (tapeworm infection), or a toy (diphtheria). In each instance cited, the reservoir is an infected person.

#### Reservoir of Infection

Reservoirs of infection are man, animals, plants, soil, or inanimate organic matter in which an infectious agent lives and multiplies and depends primarily for survival, reproducing itself in such manner that it can be transmitted to man. Man himself is the most frequent reservoir of infectious agents pathogenic for man.

# Period of Communicability

This period is the length of time a disease is infectious or capable or being transmitted to others. The period of communicability determines the length of time medical aseptic techniques are required for a given disease. See table IV, Chart of Selected Communicable Diseases, column 3, for communicable periods of disease. For information on additional diseases, refer to NAVMED P-5038, Control of Communicable Diseases in Man, 1955.

# Techniques of Communicable Disease Control

Isolation—is the separation of the patient with a communicable disease from the rest of the hospital patients by placing him in a special ward, room or area.

Disinfection—is the killing of pathogenic agents outside the body by chemical or physical means directly applied.

Concurrent disinfection—is the disinfection or destruction of infectious discharges or soiled articles as soon as possible after they leave the body of the infected person throughout the course of the disease.

Terminal disinfection—is the disinfection or destruction of infectious material after the patient recovers or dies of a communicable disease.

# MEDICAL ASEPTIC TECHNIQUES

#### PURPOSE:

To confine the disease to the patient and to protect the worker and other patients from the infection. To protect the patient from new infection or reinfection.

#### Isolation

# For a Unit in a Noncommunicable Disease Ward

A single room with running water and toilet facilities is recommended. An ISOLATION sign should be posted on the door of the room. Where a room is not available, select an area of the sick bay or ward that can be set up as much as possible as an independent unit. Establish a zone around this area as *contaminated* by using screens. Place a sign ISOLATION on the outside of the screens. Be sure all personnel and other patients know and understand the limits of this zone.

#### EQUIPMENT:

## For patient's use:

Thermometer and holder

Paper bag and wipes

Bath basin

Curved basin, glass, toothbrush and dentifrice

Bedpan and urinal

Razor, shaving cream and mirror

Wastebasket lined with large bag or two thicknesses of newspaper

#### For corpsman's use:

At entrance to unit:

Extra bedside stand with set-up for masks if they are to be used. Gowns stored on shelves of stand.

Set-up for hand washing, if sink is not available. Standard for gown if Discard Gown Method is not feasible.

Hamper.

#### In a Communicable Disease Ward

1. Establish zones within the ward. They should be designated as contaminated, sometimes contaminated, and clean areas.

Clean areas—doctor's office, nursing station, between cubicles, supply lockers, telephones.

Sometimes contaminated zones—examining rooms, dish sterilizing room, utility room. These areas must be washed with soap and

water and aired before being considered not contaminated.

Contaminated zones—the immediate surroundings of the patient, the cubicle, the patients' solarium, the lavatory and showers connected with the cubicle. All floors, inside of sinks and hoppers are considered contaminated.

2. Be sure all personnel and patients know the limits of these zones. It may be helpful to designate and name the zones as follows:

Red zone (contaminated zone). Everything must be sterilized or disinfected before leaving this zone.

Blue zone (sometimes contaminated). Everything used for the patient must be sterilized or disinfected.

White zone (clean zone). Nothing is brought into this zone from the red zone without being disinfected or sterilized. Gowns and masks are not worn in the white zone except when cleaning.

Group patients in cubicles according to their diagnoses:

Patients with respiratory diseases together.

Patients with gastrointestinal diseases together.

Patients with diseases carried by vectors together.

Patients with highly communicable diseases should be placed in separate rooms.

- 4. Each cubicle should have facilities at the entrance so that Hand Washing Technique and Gown Technique may be followed. Each cubicle should be considered a separate unit.
- 5. Cleaning. Keep down dust. Use sweeping compound or wet-mop floors, damp-dust furniture. Wear gown and mask when cleaning and damp-dusting. Follow daily and weekly cleaning schedule.
- 6. Ventilation. Fresh air is particularly important in a communicable disease ward. Cross ventilation should be present at all times. The ward should be aired at least twice daily if weather permits. Protect the patients from drafts.

#### Hand Washing Techniques

# INDICATED:

Before and after removing gown; before and after medications and treatments; before and after passing nourishment, water, or trays; before going

to meals or leaving the ward; before and after each task (fig. 134).

#### PROCEDURE:

# Sink with running water:

Hands and forearms are well lathered with soap, rubbed vigorously particularly around fingers and nails, then rinsed with hands held down to allow water to drain off finger tips. Hands and arms are dried with paper towels. The use of a hand lotion is recommended to prevent chapping. (Soap and detergents with 3 percent hexachlorophene in cake and liquid form are available on the supply table.)

## Basin technique:

The basin technique is not recommended and is to be used only when a sink is not within reasonable distance of the unit. There is no one disinfectant that is suitable for this type use in all diseases. Benzalkonium chloride should not be used when caring for a patient with tuberculosis; liquidiodine type disinfectant tends to discolor the workers' hands when used repeatedly without washing the hands under running water frequently. Regardless of the disinfectant used, the solution should be changed every 2 to 3 hours depending upon the number of people using the basin. When the Basin Technique is used, the corpsman is urged to wash his hands under running water as soon as possible and as often as possible.

# Mask Technique

#### INDICATED:

When caring for a patient whose disease is spread by droplets or discharges from the nose and throat (fig. 134).

# PROCEDURE:

Masks are washed, rolled, placed in metal containers and autoclaved. A mask is used once and then placed in the used mask receptacle. A mask is worn until it becomes moist or for 20 to 45 minutes. Once a mask is moist, it is contaminated. Do not put the mask in your pocket, leave it on a desk, or leave it dangling around your neck. Dispose of it!

### Gown Technique

#### INDICATED:

When caring for a patient whose disease is spread by droplets, discharges from the nose, throat, gastrointestinal tract or skin lesions.

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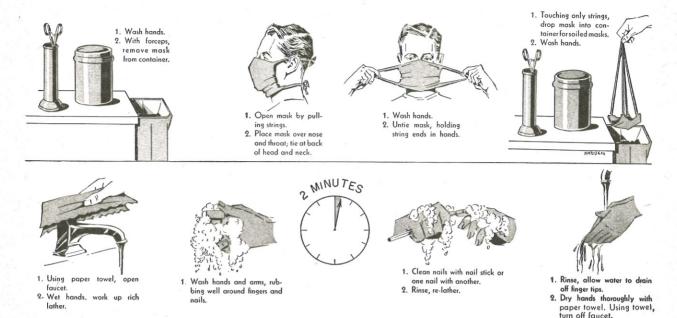


Figure 134.—Mask and Hand Washing Techniques.

#### Gowns are worn:

1. When giving contact care; changing, sorting or handling soiled linen; sweeping or cleaning the unit.

NOTE: Contact care is the care of the patient and his immediate surroundings. It includes bed baths, bed making, back rubs, treatments and taking temperatures.

Serving trays, nourishment and medications ordinarily do not require a gown unless the patient needs assistance.

- 2. By all non-nursing personnel (i.e., doctors, physical and occupational therapists, librarians among others) when in contact with the patient. Use Discard Gown Method.
- 3. By visitors who spend long hours at the bedside of a seriously or critically ill patient. Use Discard Gown Method.

#### PROCEDURE:

#### Discard Gown Method:

A clean gown is used each time it is necessary to enter the unit. On leaving the unit, the gown is removed, folded clean side out, and placed in the hamper. Used gowns may be autoclaved or sent to the laundry. The supply of clean gowns may be stored in a bedside stand at the entrance to the unit.

#### Single Gown Method:

This method is used only when the Discard

Method is not feasible (fig. 135). A gown is hung at the entrance to the unit. It is used by all personnel caring for the patient. When the gown is removed upon leaving the unit, it is folded lengthwise, contaminated side out, and hung on the standard.

#### Group Gown Method:

This method may be used where all patients on a ward have the same disease. A gown room is provided near the entrance to the ward. Each member of the ward staff is assigned a hook on the gown rack in the room. A clean gown is used daily. When not in use, the gown is hung clean side out on the worker's personal hook. For this method the gown room should be equipped as follows: A rack with sufficient hooks for each member of the staff. Each hook labeled with a member's name. Shelves for clean supplies of gowns, masks, paper towels, soap and so forth. Cabinets for worker's clothes. Scrub sink with knee levers and foot operated soap dispenser. Set-up for masks at entrance to the room.

#### Goggles Technique

# INDICATED:

When doing irrigations of infected eyes or whenever there is a possibility of the worker being exposed to a spray carrying infectious material.

# Donning Gown



- 1. Remove jumper; wash hands; put on
- With palms together, slip hands inside gown; remove from hook.



- 1. Lap edges of gown together at back. Hold flap in place.
- 2. Grasp belt end with free hand, bring to back.



- Touching only inside of gown, work arms and hands through sleeves.
   Place finger inside neckband, draw
- gown into place.



- 1. Bring other belt end to back.
- Tie belt at back tightly enough to keep flap in place.



- 1. Tie gown at neckband in back.
- 2. Grasp back edges of gown, bring to center back.



- 1. Shrug shoulders once or twice to give sufficient working room.
- 2. Push up sleeves of gown to convenient working level.

# Removing Gown



- 1. Until belt, push sleeves to 2 inches above contaminated area.
- 2. Wash hands and arms without touching cuffs of gown.
- Place 2 fingers under cuff, pull sleeve down over hand without touching outside of gown.



- 1. With hand inside sleeve, draw other sleeve down over hand.
- 2. Slip out of gown by working hands up to shoulder seams of gown.



- 1. Keeping hands inside, lift gown off shoulders.
- 2. Fold gown by bringing palms together at shoulder seams of gown.



- 1. Withdraw one hand, grasp gown just below neckband at center front.
- Withdraw other hand, bring back edges of gown together just below neckband.

  3. Hang gown on hook, contaminated side out. Wash hands.

Figure 135.—Donning and Removing Gown—Medical Aseptic Technique.

#### PROCEDURE:

Wash goggles with soap and water between each use.

# Glove Technique

#### INDICATED:

When doing contact care for patients with smallpox; when handling dressings of patients with tetanus or gas gangrene.

#### PROCEDURE:

Gloves should be initially sterile and should be washed and autoclaved between each use in patient care. Gloves are put on at the entrance to the unit.

# Handling Linen

#### INDICATED:

When handling linen of patients with diseases spread by droplets, discharge from nose, throat, gastrointestinal tract, or skin lesions.

#### General Instructions

- 1. Handle soiled linen as little as possible.
- 2. Avoid flicking linen about.
- 3. Place linen in hamper or laundry bag directly from patient's bed.

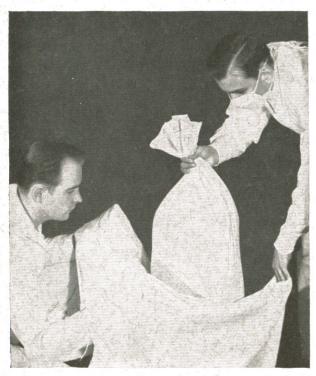


Figure 136.—Handling Contaminated Linen.

4. Autoclave linen before sending to laundry if the disease is caused by spore-forming bacteria.

#### PROCEDURE:

Isolated unit on a noncommunicable disease ward:

- Place laundry bag over the back of a chair inside the unit.
- 2. Place contaminated linen in bag as it is removed from the bed.
- 3. Close laundry bag. Place bag inside clean bag held by clean corpsman at the entrance to the unit.
- 4. The clean corpsman turns down a 8-inch cuff on the clean bag and holds the bag under the cuff. After the contaminated linen is placed in the clean bag, the clean corpsman closes the bag by turning up the cuff from the outside.
- 5. The clean corpsman ties a shipping tag labeled CONTAMINATED on the outside of the bag.

# On a communicable disease ward:

- 1. Provide a hamper for each cubicle.
- 2. Place linen in hamper for each cubicle.
- 3. Close hamper bag; label CONTAMINATED or ISOLATION.
  - 4. Send bags to laundry at specified time.

# Handling Excreta (Feces, Urine, Vomitus) INDICATED:

In all instances to protect patients and corpsman and prevent the spread of infection. Disposal of excreta into the sewerage system is adequate at most of our medical activities for patients whose diseases are spread by infectious discharges from the gastrointestinal tract.

#### PROCEDURE:

Emphasis is placed on the thorough washing of the bedpan, urinal or curved basin before returning to the patient's bedside, and on adequate hand washing (the patient and the corpsman) following each contact with these discharges. Where an automatic bedpan flusher is used, the corpsman will protect the other patients by using a paper towel when pressing down the handle of the bedpan flusher, steaming the pan or basin under live steam for two minutes and repeating the flush and steam cycle after the pan or basin has been removed.

Check local instructions for other requirements at your station.

Handling Discharges from Nose and Throat INDICATED:

When caring for patients whose diseases are spread by nose and throat discharges.

#### PROCEDURE:

Isolated unit in a noncommunicable disease ward:

- 1. Pin paper bag to patient's bed. Supply patient with paper tissues. Provide sputum cup if patient is expectorating large amounts of sputum.
  - 2. Instruct patient:

To cover his mouth and nose with tissues held in a cup-like fashion whenever he coughs, sneezes, talks to people.

To place used tissues in the paper bag on his bed.

To place several tissues in top of sputum cup, place cup in paper bag, unpin bag, and close top of bag.

To ask for new sputum cup when one is half full.

- 3. Hold clean paper bag; ask patient to drop his bag into clean one. Close top tightly; place in burnable trash can or directly into incinerator.
  - 4. Wash your hands.
- 5. Provide patient with new bag, sputum cup, tissues if needed.

For group of patients on communicable disease ward:

Set up utility cart:

Top shelf—large waxed paper bags for patient's bags. String or bandage to tie waxed bags.

Bottom shelf—clean paper bags for beds, sputum cups, tissues.

#### Collection:

Instruct patients as above.

Keep one hand clean for distributing clean supplies.

Place used bags into large waxed bags—4 patients' bags to 1 waxed bag. When all are collected, tie waxed bags securely at top. Place all bags in burnable trash can for immediate incineration. Wash down utility cart with soap and water, rubbing vigorously for 2 minutes.

Where patients are not able to assist, distribute clean supplies first. Collect patients' bags; both of your hands are contaminated.

# Handling Food Trays

#### INDICATED:

When caring for a patient whose disease is spread by discharges from the nose and throat and gastrointestinal tract.

#### PROCEDURE:

Isolation tray on a noncommunicable disease ward:

- 1. When adequate central dishwashing facilities are available, tray may be returned for dishwashing and sanitizing in the same manner as nonisolated trays. Food Service may wish such a tray to be identified by being wrapped in a newspaper or placed in a paper bag. Check local instructions.
- 2. Where trays are washed and sanitized on the ward and adequate mechanical facilities are available, the tray should be retained in the patient's room until all other trays have been processed.

When trays must be washed on the ward, the following method is suggested:

Spread newspaper on counter next to garbage disposal can.

Bring tray from patient's room and place on newspaper. Scrape solids from tray with knife or paper tray cover into garbage can. Empty glasses, bowls and cups into can. As each article is scrapped or emptied, place directly into machine; trays and dishes on sides, glasses, bowls and cups upside down, and silverware spread out.

Follow directions on the machine.

Where tray does not fit into machine, wash vigorously with hot soapy water, rinse and allow to dry.

Touching only the underside of the newspaper, fold in, clean side out, and place in burnable trash can.

NOTE: Adequate mechanical facilities imply the use of detergent; accurately timed pre-rinse, wash and rinse cycle; temperature control on the machine indicating the temperature of the water reaches 180° F. during the rinse cycle. Directions for operating the machine are posted.

When trays must be washed by hand, the following method is suggested:

Use two foot tubs, hot plate or stove.

Retain tray in patient's room until all other trays have been processed.

Spread newspaper on counter next to garbage disposal can. Fill one tub with hot soapy

water. Half fill other tub with hot water and place on stove or hot plate to boil.

Bring tray from patient's room and place on newspaper. Scrape solids from tray with knife or paper tray cover into garbage can. Empty glasses, bowls and cups into can. As each article is scraped or emptied, place in tub of soapy water.

Wash dishes, glasses and silverware in the soapy water, rinse under running water and place in foot tub on stove. Add more water, if necessary, to cover all articles. Empty tub of soapy water, rinse and place upside down on tub of dishes. Boil for 10 minutes, timing the boiling period from the time the water starts to boil.

Wash tray and inside of sink vigorously with hot soapy water (scouring powder if necessary) and rinse well.

Touching only the underside of the newspaper, fold in, clean side out and place in burnable trash can.

At the end of the boiling period, remove all articles from the tub, and allow to air dry.

#### On communicable disease ward:

1. Where adequate central dishwashing facilities are available, the trays may be processed in the same manner as all other trays. However, check local instructions for requirements at your station.

Where trays are washed and sanitized on the ward, the following method is suggested:

Set up utility cart with pails for solids and liquids.

Collect, scrape, and stack each tray.

Bring cart to door of dish-sanitizing room.

Wash dishes in hot soapy water.

Place dishes, other equipment, on sides in slotted racks of sanitizer.

Follow directions on sanitizer, watch temperature gage (180° F.), and time accurately!

Allow dishes to air dry.

Wash utility cart and shelves on contaminated side of sanitizer vigorously with soap and water for 2 minutes.

# Thermometer Technique

#### PROCEDURE:

Isolated unit on a noncommunicable disease ward:

1. Keep the thermometer at the patient's bedside in a large test tube filled with 70 percent isopropyl alcohol.

- 2. Protect the thermometer tip by placing a small amount of cotton in the bottom of the test tube.
- 3. Strap the test tube to the foot of the bed with adhesive.
  - 4. Taking the TPR:

Take a paper cup containing a cotton square moistened with water into the unit.

Remove the thermometer from test tube; wipe down with cotton. Read and shake down thermometer.

Place thermometer in patient's mouth. Take his pulse and respiration.

After 3 minutes, remove the thermometer from patient's mouth, wipe down in rotary motion with cotton, place cotton in paper cup. Read thermometer and place it in test tube.

Discard paper cup in patient's waste basket. Wash vour hands.

Record TPR in book at once.

# Care of Thermometer

- 1. Keep tube filled with isopropyl alcohol (70 percent), at all times.
- 2. Twice weekly—remove tube from bed, take to utility room. Wash thermometer and tube. Refill tube with alcohol. Restrap tube with thermometer to foot of patient's bed.

# On a communicable disease ward:

In utility room:

1. Thermometer tray containing—

Covered catheter tray filled with 70 percent isopropyl alcohol and containing enough thermometers for ALL patients.

Container for clean thermometers.

Container for soap solution.

Container for cotton squares.

Sputum cup for waste cotton.

- 2. Remove each thermometer from alcohol, rinse under running cool water, wipe down with cotton, shake down to 95° F. and place in clean container.
  - 3. Fill a container with soap solution.
- 4. Use clean wheeled cart and place all equipment, except catheter tray, on cart.

#### In ward:

1. Pick up TPR book and pencil as you pass nurses desk. Plan to take convalescent patients' TPR first (negative patients on tuberculosis service).

- 2. Distribute 3 thermometers at a time (see Procedure for Taking TPR). Place each thermometer in soap solution after it is read.
- 3. When all temperatures have been taken, wheel cart to utility room.

# Care of Equipment

# In utility room:

- 1. Wash each thermometer under running water, wipe down in rotary motion with cotton and place on paper towel.
- 2. When all thermometers are washed, place them in the tray of 70 percent alcohol.
- 3. Wash containers and place them upside down on the tray.
  - 4. Discard waste.
- 5. Wash wheeled cart vigorously for 2 minutes with soap and water.
  - 6. Wash hands.

# Daily procedure:

1. Strip tray; place thermometers on paper towel.

- 2. Boil catheter tray and containers for 20 minutes.
- 3. Reset tray, refill alcohol and cotton containers and replace thermometers in alcohol.

# Terminal Disinfection

- 1. Ordinary cleaning as described in Cleaning a Bedside Unit is all that is necessary in most instances. Air all units for 24 hours after patient's discharge.
- 2. Exception: Patient discharged by death due to active communicable disease. The following procedure should then be followed:

Use Isolation Technique in care of the body, and in the disposal of linen and equipment.

If mattress has been soiled, it should be sponged and, if possible, autoclaved. If mattress is grossly contaminated by patient's infectious discharges, burning should be considered. Check with the doctor.

Wash walls with soap and water to height of 6 feet.

Air unit for 24 hours.

Table IV.—Chart of Selected Communicable Diseases 1

That I					
Disease and causative organism	Source of infection, mode of transmission	Incubation period, communicable period	Common symptoms, possible complications	Points in nursing care	
CHICKEN POX (Varicella) Caused by virus,	Source: Secretions from skin lesions, nose and throat of infected persons.  Spread: By direct contact with discharges from lesions, nose, and throat of infected persons. Indirectly by articles freshly soiled with such discharges.	Incubation: 2-3 weeks. Communicable: From one day before until 6 days after the appearance of first crop of vesicles.	Symptoms: Mild chill and fever. Pain in back and legs. Maculopapular rash appears in 24 hours, followed by vesicular rash lasting 3-4 days. Rash first appears on trunk and covered portions of body. Different stages of rash may be on same region of body at same time. Complications: Secondary skin infection, pneumonia, conjunctivitis.	Isolate in separate room. Complete bed rest until 24 hours after temperature returns to normal. Caution patient against scratching lesions. Pat, rather than rub, skin dry when bathing patient. Use care in combing his hair. Avoid loosening scabs. Ointments, if ordered, may be applied to skin for relief of itching. Force fluids. Diet as desfred. Disinfection: All articles in contact with discharges. Incinerate paper handkerchiefs and dressings. soiled with discharges.	
COMMON COLD Caused by one or more viruses.	Source: Secretions from nose and throat of infectious persons.  Spread: By direct contact with infected person. By cough or sneeze of infected person. Indirectly by articles freshly soiled with nose and throat discharges.	Incubation: 12-72 hours. Communicable: During incubation and early stage of disease.	Symptoms: Sudden onset; slight fever, chilly sensations, coryza, general lassitude, vague aches and pains in back and limbs. Complications: Bronchitis, pneumonia, sinusitis, otitis media.	Isolation as can be accomplished by bed rest during the acute stage. Caution patient against violent nose blowing. Apply cold cream or bland ointment to upper lip and about nares. Force fluids. Diet as desired. Distriction: All articles in contact. with discharges, Incinerate paper handkerchiefs soiled with discharges,	

¹ Sources.—Lynch, T.: Communicable Disease Nursing. 2d ed. St. Louis, C. V. Mosby Co., 1949. Young, H. (Ed.): Lippincott's Quick Reference Book for Nurses. 7th ed. Philadelphia, J. B. Lippincott, 1955. American Public Health Association: The Control of Communicable Diseases in Man. 8th ed. New York American Public Health Association, 1955. (This publication is available under the listing of NAVMED P-5038.)

# Table IV.—Chart of Selected Communicable Diseases—Continued

Disease and causative organism	Source of infection, mode of transmission	Incubation period, communicable period	Common symptoms, possible complications	Points in nursing care
DIPHTHERIA Caused by Klebs-Loeffler bacillus.	Source: Discharges from nose, throat, nasopharynx of infected person or carrier. Also contaminated milk.  Spread: By direct contact with discharges from infected person or carrier. Indirectly by articles freshly soiled with nose and throat discharges. Also by contaminated milk.	Incubation: 2-5 days. Communicable: Until bacilli disappear from secretions and lesions, usually 2-4 weeks.	Symptoms: Slight sore throat, moderate fever; hoarseness; dry tight cough; malaise; increased pulse rate out of proportion to temperature; grayish white membraneous patch on mucous membrane of throat and upper respiratory passages; restlessness; dyspnea; cyanosis.  Complications: Bronchopneumonia, suffocation, myocarditis, paralysis of muscles used in swallowing and breathing, otitis media.	Isolation in separate room until 2 cultures from nose and 2 from throat are negative. Complete bed rest for 2-3 weeks or until all danger is past. Watch skin for petechiae (tiny hemorrhages under the skin) watch for signs of choking. Have suction at hand, Give frequent oral hygiene. Hot throat irrigations may give comfort. Force fluids. Diet of semisolids or as tolerated.  Disinfection: All articles in contact with patient.
INFLUENZA Caused by influenza virus.	Source: Probably discharges from mouth and nose of infected person or carrier. Spread: By direct contact with discharges and droplet infection from infected person or carrier. Air borne? Indirectly by articles freshly soiled by discharges.	Incubation: 24-72 hours. Communicable: Possibly from incubation until after fever subsides.	Symptoms: Chills, fever, malaise, generalized aches and pains, intense headache, cough, sputum seant and watery at first, increases in amount and becomes mucopurulent; mental depression, prostration out of proportion to symptoms.  Complications: Bronchitis, acute sinusitis, otitis media, pneumonia.	Isolation in separate room or ward. Complete bed rest until 24 hours after temperature returns to normal. Tepid sponges to refresh patient. Ice cap to relieve headache. Warm gargles may relieve throat irritation. Steam inhalations may relieve cough. Maintain cheerful attitude toward patient; keep room light and pleasant. Force fluids, diet as desired.  Disinfection: All articles in contact with nose and throat discharges Incinerate paper handkerchiefs
MEASLES (Rubeola) Caused by a virus.	Source: Secretions from nose, throat. Spread: By direct contact with infected person; by droplet. Indirectly by articles freshly soiled with discharges from mouth, nose.	Incubation: 10 days from exposure to onset of fever; 13-15 days to appearance of rash.  Communicable: From 4 days before until 5 days after appearance of rash.	Symptoms: Coryza, sneezing, cough, nausea, vomiting, chilliness, fever, small grayish white spots at gumline (Koplik spots). Rash appears third or fourth day; starts about ears, face, trunk and extremities. Fever increases during eruption, subsides as rash fades.  Complications: Bronchitis, pneumonia, otitis media.	Isolate in light airy room during period of communicability Avoid direct or glaring light protect patient from drafts Complete bed rest until tempera ture returns to normal. When bathing use very little soap, parather than rub skin dry. Itching skin may be relieved by 5 percent solution of sodium bi carbonate. Petrolatum may be applied about nares and lips Offer mouth wash and gargle frequently.  Disinfection: All articles in contact with discharges. Incinerate paper handkerchiefs and dressing soiled with discharge from nose throat.
MENINGOCOCCUS MENINGITIS (Cerebrospinal Fever) Caused by cocci.	Source: Discharges from nose and throat of patient and carriers. Spread: By droplet. By direct contact with patient or carriers. Indirectly by articles freshly soiled with infectious discharges.	Incubation: 2–10 days. Communicable: Until nose and throat discharges are negative for meningococci.	Symptoms: Sudden onset; fever, intense headache, nausea, vomiting, petechial skin rash; neck becomes stiff; patient stuporous or lapses into coma. Patient may assume opisthotonos position (spine arched backward to an extreme degree).  Complications: Pneumonia.	Isolate in quiet, slightly darkener room. Change patient's position frequently. Use small pillows and other devices for comfort. Patient is very sensitive traces, light and touch. Handl him gently. Give frequent back care to avoid pressure sores. Give oral hygiene before and after feeding. Apply olutment about lips Protect eyes from bright lights. Disinfection: All articles solled brose and throat discharges Incinerate paper handkerchiefs.
MUMPS (Infectious Parotitis) Caused by virus of mumps.	Source: Saliva of infected person. Spread: By droplet and direct contact with infected person. Indirectly by articles freshly soiled with saliva of such person.	Incubation: 12-26 days. Communicable: From 2 days before until swelling of glands has subsided.	Symptoms: Chilliness, malaise, moderate fever, pain on swallowing and chewing. Swelling below and in front of ear. The surrounding tissues are edematous; the submaxillary glands often swollen and tender. Features are distorted. Movements of jaw are restricted and painful. May affect one or both sides.  Complications: Orchitis, oophoritis, pancreatitis, mastitis.	Isolation for period of communica bility. Complete bed rest untafter swelling has subsided. Hea or cold may be applied to affecte areas (patient's preference). Special mouth care with frequen mouth washes or gargles. For fluids and semi-solids. Avoi acid fruit juices. A scrotal bridg may be ordered for male patient Disinfection: All articles in contact with nose and mouth discharges Incinerate paper handkerchiefs.

# Table IV.—Chart of Selected Communicable Diseases—Continued

Disease and causative organism	Source of infection, mode of transmission	Incubation period, communicable period	Common symptoms, possible complications	Points in nursing care
PERTUSSIS - (Whooping Cough) Caused by pertussis bacillus.	Source: Discharges from throat of infected persons. Spread: By direct contact with infected persons, by droplet infection. Indirectly by articles freshly soiled with such discharges.	Incubation: 7-10 days. Communicable: From onset of first symptoms until 3 weeks after "whoop" ap- pears.	Symptoms: Chilliness, malaise, moderate fever, coryza, dry hacking cough. Cough gradually becomes severe until characteristic whoop is noted. The paroxysmal stage is marked by coughing at intervals of varying frequency. Repeated paroxysms of coughing, loss of breath, whooping, and vomiting leave the patient exhausted, perspiring and apparently dazed. Complications: Bronchopneumonia, hernia, hemorrhage, prolapse of rectum, convulsions.	Isolation in a separate, well-ventilated room. Patient should be kept quiet. Tight abdominal binder may give some support during paroxysms. Serve bland nourishing foods, neither very hot nor very cold. If patient vomits soon after eating, feed again.  Disinfection: All articles soiled with discharges from nose and throat. Incinerate paper handkerchiefs.
PNEUMONIA A. Acute lobar. Caused by pneumococci.	Source: Probably discharges from nose and mouth of infected persons and carriers.  Spread: By droplet. By direct contact with infected person. Indirectly by articles freshly soiled by such discharges.	Incubation: Possibly 1-3 days. Communicable: Unknown, thought to be until organisms no longer present in discharges. Possibly by minute suspended particles containing infectious agent.	Symptoms: Abrupt onset with chill. Rapid rise in temperature to 104°-106° F; skin hot and dry; malaise and headache; pain in chest; patient lies on affected side. Flushed face, cyanosis about lips. Herpes on lips. Increased respirations with respiratory grunt. Cough with tenacious rusty sputum. Pulse full and bounding. Delirium may be present. Complications: Spread to another part of lung, pleurisy with effusion, empyema, pericarditis, endocarditis, meningitis.	Isolate patient in a separate, warm well-ventilated room free from drafts. Encourage patient to rest and relax. Complete bed rest is basic treatment. Plan procedure so as to disturb patient as little as possible. Change position every 3-4 hours. Daily bath, occasional back rub with lanolin or cocoa butter for elderly patients may prevent dry itching skin. Special mouth care every 3 hours. Apply ointment to lips to keep them soft. Force fluids. Diet as desired. See "Oxygen Therapy" for administration of oxygen. Disinjection: All articles solled by nose and throat discharges. Incinerate paper handkerchiefs.
B. Primary atypical. Caused by virus.	Source: Discharges from the nose and throat. Spread: By direct contact with infected person. Indirectly by articles freshly soiled by nose and throat discharges. Mild unrecognized infections may help spread of disease.	Incubation: Not definite. may be 7-21 days. Communicable: Unknown length of time.	Symptoms: Chilliness, fatigue, malaise, fever, range 99°-104° F. Intense headache. Painful and exhausting cough with scant sputum.  Complications: Pericarditis, pleurisy, empyema, encephalitis.	Similar to points listed under "A," bed rest for several days after temperature returns to normal.
POLIOMYELITIS (Infantile Paralysis) Caused by virus of poliomyelitis.	Source: Discharges from nose, throat, intestinal tract of acutely ill and/or convalescent patient, carrier.  Spread: Not definite. By droplet. Direct contact through close association with infected persons. Portal of entry may be nose and throat or gastro-intestinal tract.	Incubation: Usually 7-14 days. May be 3-35 days. Communicable: Latter part of incubation period and first week of illness (not definite).	Symptoms: Three stages. First stage: Gastrointestinal upset, fever, headache, malaise. Second stage: Meningeal irritation, severe headache, pain and stiffness in back of neck and limbs, muscle spasm. Third stage: Severe involvement of nervous system, paralysis. Patient may progress to all three stages, or disease may be limited to first and/or second state. Often paralysis is the first sign of the disease.  Complications: Atelectasis and pneumonia in patient with respiratory paralysis. Renal calculi, atrophy of paralyzed muscles.	Isolation in separate ward or room. Complete bed rest on a firm bed. Place fracture board under mattress. Use a covered footboard separated from mattress by blocks to prevent pressure of bedding on toes and to provide firm base for soles of feet when patient is in prone position. See "Positions for comfort." Woolen or cotton blankets should be next to patient. Physical and mental rest are essential; avoid drafts and glaring lights. Corpsman's hands should be warm when touching patient. In the acute paralytic stage, support patient's body in the position he assumes (first 24-48 hours). Later maintain body in good alignment. Baths are frequently omitted during acute stage. When bathing, use gentle sponging movements and dry by blotting rather than rubbing. Fluids during acute stage, diet as desired later. Give hypertonic fluids when hot packs are ordered (usually) as soon as diagnosis is made. See "Lay on Packs." Watch for nasal voice, hoarseness, difficulty in swallowing, twitching of facial muscles characteristic of bulbartype. Should respiratory paralysis develop, patient may be placed in a respirator.  Disinfection: All articles soiled by nose and throat discharges. In cinerate paper handkerchiefs. If municipal sewerage is not available, disinfect feces before disposal.

# ${\it Table IV.--Chart\ of\ Selected\ Communicable\ Diseases---Continued}$

Disease and causative organism	Source of infection, mode of transmission	Incubation period, communicable period	Common symptoms, possible complications	Points in nursing care
SCARLET FEVER Caused by hemolytic strep- tococci.	Source: Discharges from nose and throat, abscesses, wounds of infected persons. Also carriers. Spread: By droplet. Direct contact with patient or carrier. May be airborne. Articles freshly soiled by discharges of infected person or carrier, by contaminated milk and milk products.	Incubation: Usually 2-5 days.  Communicable: During incubation period and until few days past clinical recovery, all abnormal discharges stopped, open sores or wounds have healed.	Symptoms: Sudden onset, sore throat, vomiting, rapid rise in temperature. Tongue heavily coated, in few days becomes bright red, swollen, "strawberry tongue." Forehead and neck flushed, region around mouth is usually pale. Pulse is rapid, appetite is poor, bowels constipated, urine scanty. Restlessness, headache, insomnia, delirium, and convulsions may occur during disease.  Complications: Cervical adenitis, otitis media, nephritis, arthritis, rheumatic fever, endocarditis.	Isolation in separate room. Complete bed rest until 24 hours after temperature returns to normal. Tepid sponges may be given to reduce temperature. Addition of sodium bicarbonate to bath water may relieve itching. Olive oil or cocca butter applied during desquamation period adds to patient's comfort. Never use alcohol during desquamation stage. Give mouth care q4h, throat irrigations or gargles may give relief during sore throat stage. Accurately measure intake and output. Fluids and semisolids during acute stage. Disinfection: All articles soiled with discharges from nose, throat, sores, wounds. Incinerate paper handkerchiefs and dressings.
SMALLPOX (Variola) Caused by virus of smallpox.	Source: Discharges from nose and throat, lesions of mucous membranes and skin of infected person. Dried crusts from skin lesions remain infectious for long periods.  Spread: Direct contact with infected person. Indirectly by articles soiled by discharges from lesions, nose and throat.	Incubation: 7-16 days. Communicable: From first symptoms to disappear- ance of all seabs and crusts.	Symptoms: Sudden onset, headache, malaise, vomiting, sudden rise in temperature. Severe backache on third or fourth day, macular rash appears on face, forearms, hands, and spreads rapidly over entire body. Rash becomes papular, changes to vesicles, then to pustules, crusts. Face is swollen, lesions appear in mouth and throat, characteristic musty odor is present. Patient is very toxic. Complications: Secondary infection, conjunctivitis, laryngitis, septicemia, nephritis.	Isolate in separate room. Wear close-fitting cap in addition to gown. Place cradle over painful portions of patient's body. Tepid sponges and sedatives may relieve restlessness, delirium. Addition of sodium bicarbonate to bath water may relieve itching. Applications of olutments to hands and feet may soften skin to help lessen pain of rash breaking through skin. Do not remove crusts forcibly, allow them to drop off. Mouthwash of penicillin is frequently given when lesions are on mucous membranes. Hot throat irrigations may be helpful. Apply cream about lips and nares. Protect eyes from direct light, apply ointment to lids, eye irrigations may be ordered. Force fluids and semi-solids. Feed patient when hands are involved in rash. Disinfection: All articles in contact with patient or soiled by discharges. Use special care in handling linen. Incinerate paper handkerchiefs and dressings.
TUBERCULOSIS (Pulmonary) Caused by tubercle bacilli.	Source: Persons with "open" tuberculosis (sputum, nose and throat discharges contain tubercle bacilli). Spread: Direct or indirect contact with infectious persons; by means of coughing, sneezing, droplets. Infections rarely occur from casual contact but usually from long and close exposure.	Incubation: Variable. Communicable: As long as the tubercle bacilli are dis- charged by the patient.	Symptoms: Fatigue without cause, loss of weight, cough of three or more weeks duration which does not respond to treatment.  Loss of appetite and digestive disturbance. Night sweats. Afternoon temperature elevation. Tubercle bacilli may be found in sputum and/or gastric washings. Lesion may be found on chest X-ray.  Complications: Spread, pleurisy with or without effusion, hemorrhage, atelectasis, spontaneous pneumothorax.	Isolation in separate room or ward, Tuberculosis is a long-term disease, therefore morale is an important factor. Rest is the most important factor. Rest is the most important part of treatment. Encourage strict observance of a.m. and p.m. rest periods. Teach patient ways to protect himself and others from infection. Daily bathing if condition permits, watch closely for pressure sores on bony prominences. Demonstrate care of sputum, sputum cups. Foods high in vitamin B and C should be given, served attractively and at the proper temperature.  Disinfection: All articles in contact with patient. Incinerate paper handkerchiefs and sputum cups.

# Table IV.—Chart of Selected Communicable Diseases—Continued

Disease and causative organism	Source of infection, mode of transmission	Incubation period, communicable period	Common symptoms, possible complications	Points in nursing care
DYSENTERY A. Amebic (amebiasis). Caused by Endomoeba histolytica.	Source: Feces of infected persons, especially carriers.  Spread: Indirectly by foods, articles, water, illes; soiled hands of infected food handlers.	Incubation: 5 days to several months, commonly 3-4 weeks.  Communicable: During course of infection and until feces are negative for ameba.	Symptoms: Diarrhea and abdominal cramps. Fever, weight loss, general debility, diarrhea, often bloody or watery stools, foul odor to feees. May be alternate constipation and diarrhea.  Complications: Liver a b-scess, hepatitis, lung abscess.	Room with screened door and windows. Complete bed rest during acute stage. Teach patient to wash hands after defecation and before handling food. Measure intake and output. Chart description of each stool. During acute stage feed patient frequent small meals high in carbohydrates, after acute stage diet should be high in protein. Avoid fruit juices, leafy vegetables, salads. When emetine hydrochloride is being administered, watch patient for symptoms of visual disturbance, increased pulse rate, fall in blood pressure, pallor or cyanosis.  Disinfection: All articles in contact with discharges from alimentary tract. Disinfect feees before disposal if municipal sewerage is not available.
B. Bacillary (shigellosis). Caused by various species of Shigella.	Source: Feces of infected persons and carriers. Spread: Indirectly by foods, water, articles contaminated by infected person of carrier; also contaminated flies.	Incubation: 1-7 days. Communicable: During disease and until feces are negative for organisms.	Symptoms: Mucus or bloody diarrhea, abdominal cramps, tenesmus, fever, prostration. In severe cases, marked dehydration, abdominal distention, coma.  Complications: Arthritis, pneumonia.	Room with screened door and windows. Bed rest depends upon the severity of disease. In acute stage, prevent chilling, keep room warm and quiet. Because disease may be of long term duration and be debilitating, daily baths with special attention to bony prominences are important. Devices for comfort should be employed where useful. Special mouth care q3h; force fluids during acute stage, avoid milk. Give frequent small meals, gradually return to normal diet.  Disinfection: Same as for amebic.
TYPHOID FEVER Caused by typhoid bacillus.	Source: Feces or urine of infected persons and carriers.  Spread: Direct contact with patient or carrier, indirectly by contaminated water, food, milk, shellfish, flies.	Incubation: Usually 7-21 days. Communicable: From first symptoms throughout convalescence or until excreta is repeatedly negative for organism.	Symptoms: Variable, lasts 4-6 weeks. First week: constant severe headache, irregular pulse, cough, bronchitis, constipation or diarrhea. Epistaxis (nose bleed), fever higher each p.m. until it reaches 104-105° F. Second week: Fever remains high, heavily coated tongue, sores, rose spots on abdomen, pulse slow in proportion to temperature, dullness, lethargy, low muttering delirium, eyes open and staring. Third week: Gradual decline in temperature, beginning of convalescence. Convalescence is long, may be 2 weeks to several months.  Complications: Intestinal hemorrhage may occur in the in disease. Phlebitis, bronchitis, pneumonia, cholecystitis.	Isolate in room with screened door and windows. Plan care to provide maximum rest for patient. During period of high fever take rectal temperatures, give tepid sponges, ice cap to head, mouth care q3h. Watch bony prominences closely for pressure areas, Avoid pressure on abdomen when bathing patient. Stay with patient during delirium. Allow patient to chew gum if he is able. If constipation is present, enemas may be ordered, give very slowly. Cathartics are not given because of danger of perforating intestines. Diet—high caloric, high carbohydrate in frequent small meals. Force fluids. Patient may be fed because of lethargy and poor appetite. Disinfection: All articles in contact with patient. Disinfect excreta before disposal when municipal sewerage is not available. Incinerate all burnable materials.

# ${\it Table IV.--Chart\ of\ Selected\ Communicable\ Diseases---Continued}$

Disease and causative organism	Source of infection, mode of transmission	Incubation period, communicable period	Common symptoms, possible complications	Points in nursing care
MALARIA Caused by protozoan parasite (four types). Plasmodium vivax. Plasmodium deliparum. Plasmodium ovale. Plasmodium malariae.	Source and reservoir: Infected mosquito and the blood of infected person.  Spread: By bite of infected anopheline mosquitoes.	Incubation: Varies with species of infecting organism.  Communicable: As long as sexual form of organism exists in blood of patient in sufficient quantities to infect anopheline mosquitoes.	Symptoms: Shaking chills, periodic fever, headache, malaise, skin hot and flushed during chills and high fever. After chills, profuse diaphoresis, extreme thirst, delirium, spiking temperature backache.  Complications: Anemia, hemoglobinuria, frequent relapses.	Room with screened door an windows. If not available, place netting over bed. Bed rest during paroxysms of chills and fever Cold stage: apply blankets, ho water bottles, urge hot drinks As hot stage develops (immediately after cold stage) gradually remove heat. Tepid sponges an tiec cap to head may help during this stage. Force cold fluids Place small pillow under smal of back to relieve ache. If delirious, apply sidebars to bed a safety measure. Sweating stage follows hot stage, temperature drops rapidly, profuse diaphore sis. Force fluids, change liner frequently, keep dry, avoid draft to prevent chilling patient Three stages may last 6-10 hours Observe and record time, severity and duration of each stage.
DENGUE Virus of dengue fever.	Source and reservoir: Infected mosquito and blood of infected persons 1 day before and up to 5 days after onset.  Spread: By the bite of mosquito, infected by biting a patient during the above period. The mosquito becomes infectious after an interval of 8-11 days.	Incubation: 3-15 days. Communicable: From day before onset until the fifth day of disease, patients are infective for mosquito.	Symptoms: Sudden onset, high fever, intense headache, joint and muscle pains, irregular eruption. Intense pain in eyes may be a complaint.  Complications: Rare, asthma, peripheral neuritis.	Room with screened door and windows for 5 days. Bed res during fever period. Ice cap to head. Cradle to keep top cover off painful joints. Calamin lotion to relieve tiching. Protee eyes from direct or strong light Cold compresses to eyes may be soothing. Urge patient to keep eyes closed as much as possible
PLAGUE Types: Pneumonie Bubonic Caused by plague bacillus.	Source and reservoir: Infected rodents, lice, and patients. Spread: Direct by droplet, nose and throat discharges in pneumonic form. Bubonic transmitted from rodent to man by bite of flea.	Incubation: 2-6 days. Communicable: Pneumonic during active stage. Bu- bonic—not communicable from man to man.	Symptoms: Pneumonic form: Bronchopneumonia develops rapidly, sputum bloodstreaked and watery. This form is usually fatal in short time. Bubonic forms: Sudden onset; headache, vomiting, prostration. Delirium, conjunctiva injected, facial expression of weariness characteristic. Tongue furred and swollen, subcutaneous hemorrhages giving rise to term "Black Death." Lymph glands become swollen, painful, and may suppurate, especially those of the neck, groin, and axilla.  Complications: High mortality rate, secondary pneumonia, and pleurisy.	Isolation in room with screened windows. In pneumonic type: Worker wear close fitting hood, goggles, cover alls, rubber gloves. Nursing care that of pneumonia. Buboni Type—nursing care is that of ty phoid fever. The patient is very ill and needs constant care. Disinfection: In pneumonic type—all sputum, tissues, contaminate with mouth and nose secretion must be burned. In buboni type, burn all dressings and bandages. Both types: all contaminated equipment must be disinfected. Area of original in fection should be treated to de stroy rats and fleas. Terminal disinfection: Autoclavmattress, pillows, all equipment Wash walls and floors with soan and water. Air room for 48 hours and water. Air room for 48 hours
TYPHUS FEVER A. Epidemic B. Endemic Caused by Rickettsia prowazeki.	Source and reservoir: A. Epidemic type, infected persons, lice. B. Endemic type, infected rats. Spread: A. Epidemic type. Bite of infected louse, or feces of infected louse inoculated into bite or wound. B. Endemic type, bite of infested flea.	Incubation: 6-15 days. Communicable: Not from man to man. Patient is infective to lice during fever and possibly 2-3 days after temperature is normal.	Symptoms: High fever, chills, severe headache, severe back and generalized body aches and pains. Rash about fifth day covering trunk but avoids hands, feet, face. Cough, bronchitis. Pulse slower than fever would indicate. May become stuporous, delirious.  Complications: Bronchitis, bronchopneumonia, otitis media, mastoiditis.	Place in room or ward after all lice and nits have been removed from his person. Patient and bedding should be dusted with DDT once a week during febrile period Force fluids during period of high fever. Care is similar to that o typhoid fever.  Disinfection: As for a general hos pital patient. Handle linen care fully.

# THE CARE OF THE PATIENT ON THE SURGICAL SERVICE

Review, Chapter III, "Shock," "Hemorrhage," "Wounds," "Management of Miscellaneous Disorders"

Patients on the surgical service are those who have had or are to have operations. Their nursing care will be basic patient care plus surgical aseptic techniques and the procedures required by their local condition.

Surgical aseptic techniques help prevent the spread of infection through the use of sterile supplies and equipment. Techniques to use and rules to follow in wound management are discussed in Surgical Dressings. The preparation of sterile supplies and equipment in central supply and the techniques utilized in the operating room may be found in Unit VI.

# PREOPERATIVE CARE

The success of an operation depends to a large extent upon the preoperative condition and preparation of the patient.

The corpsman is responsible for the physical preparation of the patient according to the doctor's order. The mental preparation of the patient, while not a written order, is just as important to the patient and to the success of the operation. The corpsman should keep in mind that regardless of how the operation is recorded in the records (i.e., major or minor) it is always a serious major operation to the patient.

The patient's fear of the operation itself, of not knowing what to expect, of being at the mercy of others without a chance of defending himself, or of not knowing what the outcome will be, have considerable bearing on his disposition toward the operation. The corpsman through his close association with the patient is able to lessen his fears by explaining and performing his tasks in a confident manner, by observing and reporting to the doctor when more technical and professional advice is indicated.

When a patient is scheduled for operation, the corpsman should routinely notify the chaplain of the patient's faith. The chaplain will be able to give the patient advice and guidance in family or religious matters.

Usually the patient will be in the hospital several days or weeks prior to the operation. He

will have a complete physical examination, numerous laboratory tests, medications, and treatments ordered to bring him to the best physical condition for operation. During this period he will have time to think and ponder over the possible result of the operation. Confidence in all personnel, explanation and assurance by the doctor of his ultimate recovery, will help in having the patient in mental readiness for the operation.

A signed permission must be obtained for all patients (other than members of the Uniformed Services) before the operation may be performed. Check local instructions for requirements.

# Skin Preparation Procedure

Different solutions and methods of skin preparation may be preferred to the procedures outlined below. Check the local procedure manual or with the doctor for the desired solutions and methods.

# **DEFINITION:**

Skin preparation consists of cleansing and shaving an area sufficiently large to provide ample field for operation.

# PURPOSE:

To make operative field as clean as possible.

#### **EQUIPMENT:**

Safety razor with new blade Green soap and warm water Clean gauze sponges or flats Curved basin Rubber sheet with cover Applicators Spot light

# PROCEDURE:

Refer to chart for proper area to be prepared for operation (figs. 137, 138).

- 1. Wash your hands!
- 2. Explain the procedure to the patient.
- 3. Screen patient to provide privacy.
- 4. Place covered rubber sheet under area to be prepared.
  - 5. Place light at best angle to see hairs.

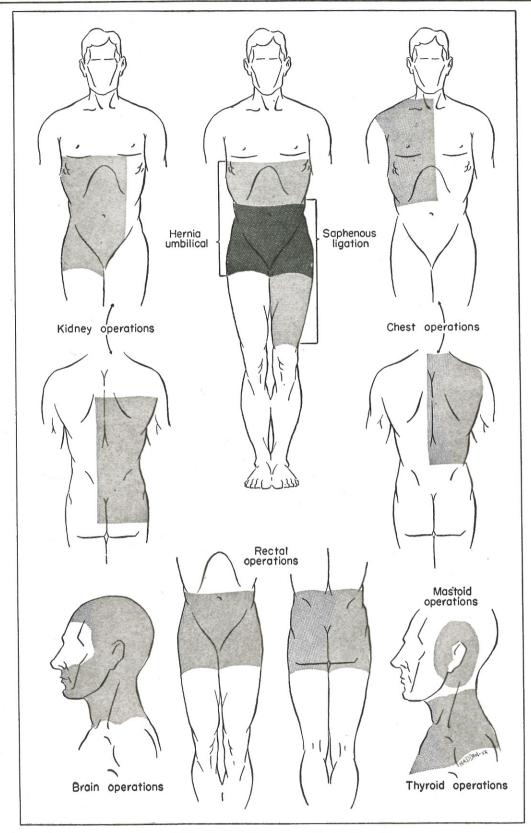


Figure 137.—Areas of Skin Preparation for Operation.

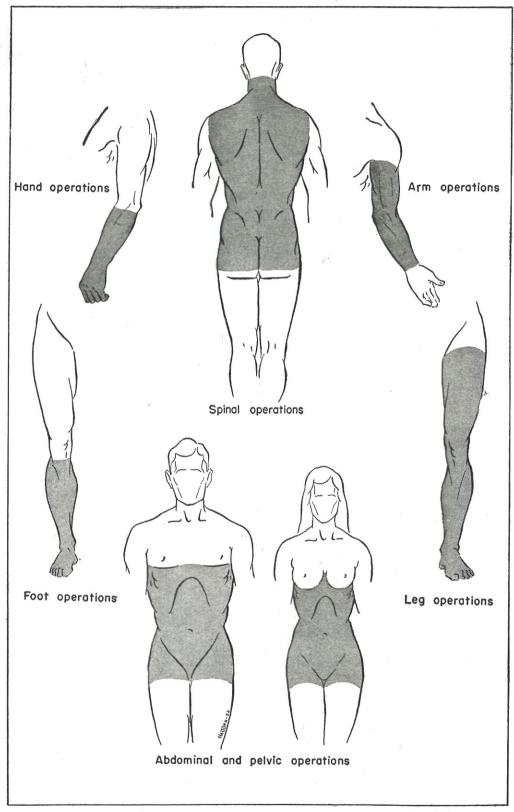


Figure 138.—Areas of Skin Preparation for Operation.

- 6. Moisten gauze, lather small area at one time.
- 7. Shave in direction of hair growth. Avoid scratching the skin with razor.
- 8. Clean umbilious with moistened applicators if operation requires abdominal preparation.
- 9. Shave lumbar area (if hair is visible) for patient receiving spinal anesthesia.
- 10. Have patient take a shower or tub bath after shaving is completed. If detergent with hexachlorophene is used for skin preparation, have patient shower before shaving area.

# Orthopedic Skin Preparation

First Preparation (48 hours before)

#### **EQUIPMENT:**

Shaving tray plus sterile gauze flats
Sterile forceps in disinfectant solution
Orangewood stick for finger and toe nails
Nail brush
Sterile towels
Bandage, tape
Green soap, alcohol, ether

#### PROCEDURE:

- 1. Shave area as described on chart. Use orangewood stick and brush for finger and toe nails (fig. 138).
  - 2. After area is shaved:

Pick up gauze flats with forceps, pour green soap on gauze.

Clean area, starting at one point and continuing until entire area is covered. Do not go back over any area twice. Repeat with alcohol. Repeat with ether.

Wrap area with sterile towels, keeping inside of towel sterile. Secure towels with bandage, adhesive tape around bandage.

# Second Preparation (24 hours before)

Repeat entire procedure.

Doctor may order painting of the area with an antiseptic. If so, allow area to dry thoroughly before wrapping in sterile towel.

#### Immediate Preoperative Preparation

Modification of this routine will be made due to variety of operations, anesthetics, and preferences of doctors. Check doctor's orders!

# Day before surgery:

- 1. Urge patient to take frequent rest periods, to drink plenty of water.
- 2. Check laboratory work, see that all reports are on chart. Check to see if operative permit has been obtained.
  - 3. Light supper.
  - 4. Cleansing enema if ordered.
  - 5. Skin preparation of operative site.
  - 6. Complete bed or tub bath or shower.
  - 7. Hypnotic if ordered.

# Day of surgery:

- 1. Nothing by mouth.
- 2. Early a.m. care.
- 3. Take TPR and blood pressure; note, record and report any signs of a cold (sore throat, sniffles, elevated temperature, cough, expectoration).
- 4. Remove jewelry—wedding band may be retained by patient and secured by a bandage passed through the ring and tied at the wrist.
  - 5. Remove any prostheses:

Place teeth in cup; place eye in drawer of bedside locker.

Place leg in clothes locker (properly tagged).

- 6. Female patients—remove bobby pins, combs from hair. Wrap hand towel around head, secure in front of head with pin. Remove lipstick, nail polish (anesthetists watch lips and nails for signs of cyanosis).
  - 7. Reverse pajama coat, omit pants.
- 8. Have patient void one-half hour before going to operating room. If patient is unable to void, notify doctor who may order catheterization.
- 9. Prepare prescribed preoperative hypodermic, give as patient leaves for operating room unless a specified time has been ordered.
- 10. Place patient on stretcher—cover carefully. The amount of covering will depend upon the distance the patient will have to travel to the operating room, the climate, and the condition of the patient.
- 11. Send patient's chart, X-rays (if required) with patient.

#### While patient is in operating room:

1. Provide for ventilation of bedside unit, prevent drafts by placing screen in front of open window.

- 2. Prepare recovery bed and top of bedside locker (see Bed Making).
- 3. Move furniture to provide sufficient room for stretcher and other apparatus.
  - 4. Obtain other equipment.

Shock blocks.

Bottle, tubing, connecting tip if there is a possibility of drainage from operative site.

5. Have intravenous infusion equipment, Wangensteen apparatus, or other apparatus that may be needed, in readiness.

# POSTOPERATIVE CARE

#### Immediate Care

- 1. Remove hot water bottles from bed if present.
- 2. Roll back top bedding.
- 3. Assist with lifting patient from stretcher (three-man or draw-sheet carry).
- 4. Place in position (according to doctor's orders).

General anesthesia: Patient flat in bed without pillow, head turned to one side.

Spinal anesthesia: Patient flat in bed or in shock position.

Local anesthesia: Patient may have head of bed elevated.

5. From anesthetist:

Find out type and nature of anesthesia and operation.

Immediate postoperative orders—presence of drainage tubing.

Locate and inspect dressing. Inspect frequently thereafter.

#### 6. Care:

Take pulse, respiration, blood pressure at once and every 15 minutes until patient has reacted. Pulse will usually be 10 to 20 beats above normal until recovery. Respirations will be 18 to 24.

Watch for snorting, noisy respirations, dusky hue to skin—patient may be swallowing tongue. Hold jaw upward and forward (fig. 139a), hold tongue with tongue depressor.

Remain with patient until he is conscious.

If patient has an airway, remove it as he begins to respond. Figure 139b illustrates the curve of the airway; when removing, follow same arc to avoid injuring patient's throat.

Connect drainage tubing if present.

Inspect dressing frequently for signs of bleeding.



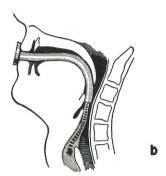


Figure 139.—(a) Holding Jaw.
(b) Airway in Place.

# When patient reacts:

- 1. Remove excess covering.
- 2. If patient is groggy, place side bars on bed as safety precaution.
  - 3. Check working order of apparatus.
- 4. If in pain give prescribed medication. Start sips of water by mouth if ordered and no nausea is present.
- 5. Watch voidings. If patient does not void 8 hours after last voiding, try measures to induce him to void. If patient is unable to void, notify doctor.
  - 6. Urge patient to take deep breaths every hour.
- 7. Nausea and vomiting due to anesthesia should not last longer than 4 to 5 hours. If it does it may be due to idiosyncrasy to drug or complications; report to doctor.

#### Later Care

- 1. Give basic nursing care plus medications and treatments ordered.
- 2. Watch for signs of postoperative discomfort and complications.
- 3. Encourage patient to help himself as much as possible. The patient may be permitted out of bed the day of operation or soon after. This general practice has shortened the length of hospital stay and hastened return to complete health.

## POSTOPERATIVE DISCOMFORTS

#### Headache

# Causes

- 1. Effect of anesthesia.
- 2. Nervousness.
- 3. Fatigue.
- 4. Confusion.
- 5. Excitement.
- 6. Poorly ventilated room.

## Treatment

Quiet, rest, fresh air, ice cap to head, hot water bottle to feet, medications if very severe.

## Backache

#### Causes

- 1. Uncomfortable position on operating room table.
  - 2. Undue strain during surgery.
  - 3. Lying in one position too long.

#### Treatment

- 1. Careful lifting of patient.
- 2. Frequent change of position. Urge patient to move about in bed.
- 3. Alcohol back rubs (remove binders during back rub).
- 4. Pillows for support—at back, between knees, under abdomen.

#### Thirst

## Causes

- 1. Dehydration.
- 2. Preoperative hypodermic.
- 3. Anesthetic.
- 4. Profuse perspiration.

#### Treatment

- 1. Water by mouth, if allowed.
- 2. Moisten lips with sponge dipped in cold water.
  - 3. Mouth wash.
  - 4. Chewing gum.

## Nausea and Vomiting

## Causes

May be due to anesthetic or idiosyncrasy to drug.

#### Treatment

1. Deep breathing exercises to eliminate anesthetic as soon as possible.

- 2. Medication so patient can rest, if necessary.
- 3. Wangensteen suction drainage if ordered.

## Restlessness and Sleeplessness

## Causes

Any of the above discomfort; pain, worry, reaction, and so forth.

## Treatment

Reassure patient, help him relax by alcohol back rub, straightening bed, shaking up pillows, morphine or barbiturate if ordered.

#### Pain

#### Causes

- 1. Anesthetic wearing off.
- 2. Trauma from manipulations or manual procedure during the operation.

## Treatment

- 1. Change position if allowed.
- 2. Use abdominal binder and pillows for support.
- 3. Prevent coughing or vomiting as much as possible.
  - 4. Administer medication if prescribed.

#### Abdominal Distention With Gas Pain

## Causes

- 1. Taut muscles.
- 2. Remaining in one position too long.
- 3. Sluggish peristalsis.

## Treatment

- 1. Frequent change of position. Urge patient to move about in bed.
- 2. Insert rectal tube if not contraindicated. (Insert about 3 inches with the other end of tube in a urinal to prevent chance of soiling bed.)
  - 3. Hot water bottle to the abdomen if ordered.

## Hiccup (Singultus)

## Treatment

- 1. Have patient breathe into paper bag held close to his face so that bag inflates and deflates with each respiration.
- 2. If fluids are permitted—have patient take several large swallows of water while holding his breath. If these measures do not stop hiccups report to doctor.

## POSTOPERATIVE COMPLICATIONS

## Pneumonia

#### Causes

- 1. Infection carried to lungs from infected area of operation.
  - 2. Aspiration of vomitus.
  - 3. Irritation of lungs by anesthetic.
  - 4. Patient becoming chilled.
  - 5. Patient lying in one position too long.
- 6. Result of a cold which patient, other patients, or personnel might have had.

# Symptoms

- 1. Elevated temperature, increased pulse rate and some difficulty in respiration.
  - 2. Productive cough.
  - 3. Pain in chest.
  - 4. Symptoms usually appear on third day.

#### Preventive Measures

- 1. Frequent changes in position.
- 2. Deep breathing exercises.

#### Treatment

As prescribed by doctor.

## Peritonitis

#### Symptoms

- 1. Increase in temperature, pulse, and respiration.
- 2. Patient appears toxic (general poisoning of blood due absorption of bacterial products).
  - 3. Sudden onset of abdominal pain.
- 4. Tender, rigid, board-like abdomen with distention.

## Treatment

- 1. Fowler's position—to localize inflammation.
- 2. If wound is draining, frequent change of dressings.
  - 3. Insertion of rectal tube if prescribed.

## **Tympanites**

Paralysis of the peristalsis, with distention of the abdomen, due to gas and feces (alertness and good nursing may prevent this condition). Watch for signs of distention, and begin treatment before serious trouble begins.

## Symptoms

- 1. Abdominal pain and discomfort.
- 2. Abdominal distention.
- 3. Respiratory difficulty.
- 4. Increased pulse and respiration rate.

## Treatment

- 1. Urge patient to move about in bed.
- 2. Change patient's position frequently.
- 3. Insertion of rectal tube if prescribed.

## Suppression of Urine (Kidney Failure)

## Symptoms

- 1. At first urine is scanty.
- 2. Headache, dizziness, impaired vision, nausea, restlessness.
  - 3. Puffiness under the eyes.
- 4. Later urine is entirely absent; odor of ammonia to breath.
- 5. Patient becomes delirious, drowsy, has muscular spasm.
- 6. Patient has convulsions, coma, and death—unless he responds to treatment.

#### Treatment

As prescribed by doctor.

## Retention of Urine (Inability to Void)

## Methods to Induce Urination

- 1. Give warm drinks or small amounts of hot water.
  - 2. Let patient hear the sound of running water.
  - 3. Let patient immerse hands in warm water.
  - 4. Hot water bottle over bladder area.
- 5. Enema or Sitz bath—only on order from doctor.
- 6. Allow to sit on or stand by side of bed—requires doctor's order.

#### Treatment

Catheterization if prescribed by doctor.

## Infection

## Causes

- 1. May be due to conditions existing before operation.
- 2. May be due to bacteria introduced into wound during or following operation. Infection may be local or general.

## Symptoms

- 1. Sharp rise in TPR.
- 2. Abdominal pain or discomfort in area of operation.
  - 3. Abdomen may be distended.
  - 4. Drainage from incision.

#### Treatment

As prescribed by doctor.

#### Intestinal Obstruction

## Symptoms

- 1. Abdominal distention.
- 2. Frequent vomiting in small amounts.
- 3. Sharp colicky abdominal pain with intervals of no pain.
  - 4. Hiccups.

#### Treatment

- 1. Frequent change of position.
- 2. Wangensteen, if ordered.
- 3. May require surgical intervention.

## Thrombophlebitis

## Symptoms

- 1. Cramp-like pain, swelling of the limb, or both.
- 2. A lump may or may not be felt under the skin of painful area.

#### Treatment

- 1. Do not rub, massage, or bathe limb.
- 2. Elevate limb on pillow—keep the patient and limb at ease.
- 3. Immobilize the limb with sandbags or pillows.
  - 4. Application of heat—dry or moist as ordered.

# Embolus (Pulmonary)

## Symptoms

- 1. Sudden onset, collapse.
- 2. Pain in chest.
- 3. Acute sudden respiratory distress.

## Treatment

- 1. Complete bed rest—Fowler's position.
- 2. Oxygen therapy.

## SURGICAL DRESSINGS

Review—Chapter III, Management of Regional Wounds and Injuries, Bandages and Methods of Regional Bandaging

Chapter VII, Antiseptics, Germicides, Fungicides, and Parasiticides

There are two types of wounds to be dressed: Clean wounds which are made under aseptic conditions. These are usually closed wounds that heal by primary intention without infection.

Dirty or contaminated wounds which are usually open, draining wounds that heal by secondary intention. They are usually infected or possibly infected. Rectal and intestinal wounds are usually considered *dirty* because of the contamination by fecal material.

A surgical dressing has two meanings:

Covering a wound with material made of gauze or cotton.

Removing a dressing, treating the wound and applying fresh dressing.

## PURPOSES:

To protect the wound from injury or infection; to absorb drainage; to permit inspection or treatment of the wound.

## INDICATED:

Whenever ordered by the doctor.

#### Corpsman's Duties

- 1. To prepare the patient and his unit.
- 2. To prepare and assemble the necessary equipment.
  - 3. To assist the doctor as required.
  - 4. To do the dressings as required.

## Rules for Handling Sterile Equipment

The following rules are based on the major principle of surgical aseptic technique which is: All articles coming in direct or indirect contact with a wound must be sterile.

- 1. An article is either sterile or unsterile. There is no in-between. If any doubt exists, consider it unsterile.
- 2. Sterile articles must be kept covered until ready for use.

- 3. Only the outside of the wrapper or cover is touched when opening a sterile package or container.
- 4. A sterile article is handled with a sterile instrument or sterile gloves.
- 5. Once an article is removed from a sterile container it is not returned to that container.
- 6. When lifting a sterile basin, slide hands under the basin.
- 7. When removing an article from a sterile container:

Use technique forceps. Only that part of the container and that part of the forceps covered by the disinfecting solution may be considered sterile. Always hold tip of forceps pointing downward.

Remove the cover of the container. Hold the cover in one hand. Remove the article with the technique forceps in the other hand. Replace the cover. (If it is necessary to put down the cover, place it upside down on a flat surface.) Replace forceps in its container—straight down and in.

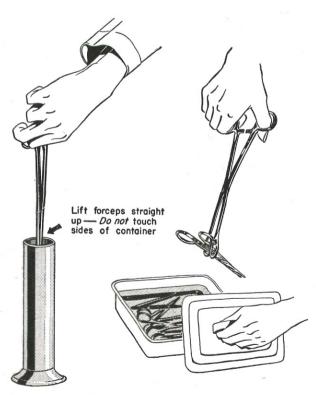


Figure 140. Technique Forceps.

Figure 141.
Removing Article from Sterile Container.

- 8. When a container becomes contaminated, remove it at once. If it is not possible to do so immediately, invert the cover on the container to signify its contamination.
  - 9. Avoid reaching over a sterile field.
- 10. Edges of sterile towels are considered unsterile after contact with an unsterile surface.
  - 11. Keep instrument handles out of sterile field.
- 12. Pour sterile solutions without contact between the bottle and sponge or container.

## Disinfectant Solutions for Technique Forceps

The following disinfectant solutions for technique forceps are presently being used in Naval medical facilities. Check the procedure manual, station instructions, or with the doctor for local preference.

Isopropyl alcohol 70 percent with 0.5 percent sodium nitrite.

Benzalkonium chloride aqueous 1:1,000 with 0.5 percent sodium nitrite.

Liquid iodine-type disinfectant 200 parts per million available iodine with 0.5 percent sodium nitrite.

Formaldehyde in alcohol solution:

## THE DRESSING CARRIAGE

The dressing carriage serves as a portable supply table containing all the sterile and clean articles necessary for changing a series of dressings. The amount and type of supplies needed will vary according to the type of ward and the number of patients being served.

## EQUIPMENT:

Where possible, the use of individual autoclaved dressing trays from CDR is recommended. These trays may be ordered with the other supplies in the morning and stored on the carriage until used.

#### Top shelf:

- 1. Sterile containers holding—
  - 4 x 4 gauze flats
  - 2 x 2 gauze flats

Towels or field cloths Tongue blades Applicators Safety pins Instruments

- 2. Two technique forceps in separate containers which are three-fourths full of disinfectant solution.
- 3. Solutions and ointments as required for the ward.

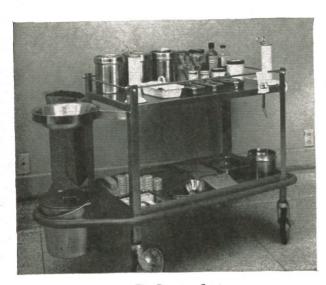


Figure 142.—The Dressing Carriage.

## Bottom shelf:

 Sterile packages of— Abdominal pads Towels

Gloves (assorted sizes)

Culture tubes, packing, slides and so forth, as required for the ward.

2. Clean supplies— Curved basins

Paper bags

Tray for clean, unused dressings.

Bandages (assorted sizes)

Metal container of soap solution for soiled instruments

3. Attached to bars of dressing carriage—Roller of adhesive tape (assorted sizes)
Bandage scissors

Paper bag for used gloves and soiled towels

4. Bucket for wastes. Line bucket with a large paper bag or several thicknesses of newspaper.

# Care of Dressing Carriage

## Daily:

1. Clean and reset carriage—

Remove all the equipment from the carriage. Clean and boil technique forceps, instruments,

and their containers or return them with other containers to CDR for autoclaving and receive new supply.

Wash down the entire carriage.

Reset carriage.

Fill the technique-forceps container three-fourths full of disinfectant solution.

- 2. Replace equipment listed.
- 3. Check carriage for completeness.

## After dressings are completed:

- 1. Clean soiled instruments, boil and replace on tray. If instruments are to be autoclaved, return to CDR.
- 2. Remove soiled dressings, place in burnable trash can.
  - 3. Replenish other supplies as needed.

## Weekly:

- 1. Check the date on all sterile packages.
- 2. Return outdated articles to CDR.
- 3. Return articles not in current use to CDR.

# Changing Dressings

## PROCEDURE:

- 1. Wash your hands!
- 2. Bring dressing carriage to patient's bedside.
- 3. Screen patient. Explain procedure. Ask him to put his hands under his head and keep them there until the dressing is completed to avoid contaminating the sterile field.
- 4. Fold back bedclothes to expose the area to be
- 5. Place dressing basin (lined with paper bag) on the bed to receive soiled dressings.
- 6. Loosen patient's dressing. To remove adhesive: Press skin taut under adhesive with one hand; with other pull tape toward wound.
- 7. Set up sterile field. Using the technique forceps, remove following sterile articles from their sterile containers:

Sterile towel, open to two thicknesses, place on patient's bed near dressing or on patient's bedside table.

Sterile 4 x 4 and 2 x 2 gauze sponges for dressing. Use judgment in setting out these



Figure 143.—Removing Adhesive.

supplies. (Three to six 4 x 4's are all that are required for most dressings.)

Thumb forceps and hemostat. Place instruments so that the handles are over the edge of the towel.

- 8. Remove the outer dressing, inspect it, and place it in the dressing basin.
- 9. Pick up the thumb forceps, remove the inner dressings carefully so as not to remove a drain or tube if present; inspect the dressing. Drop into dressing basin.
  - 10. Clean wound:

Pick up a sponge with a hemostat. Pour solution to be used over the sponge.

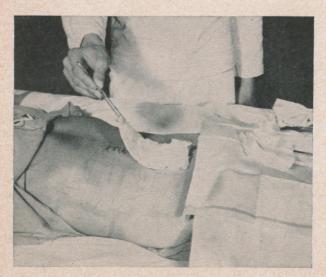


Figure 144.—Remove Inner Dressing.



Figure 145.—Cleaning a Wound.

Clean incision line using rotary motion. Discard sponge. Repeat with additional sponges cleaning around the wound.

Inspect the wound. Any swelling, redness or discharge? Does the patient complain of tenderness or pain?

- 11. Open fold of 4 x 4's with hemostat and apply to wound.
  - 12. Apply sterile pad if needed.
- 13. Cut strips of adhesive tape to fit patient. Apply adhesive tape. Secure tape on far side of dressing, pull snugly, fasten on near side.
- 14. Remove soiled dressing, place in bucket on carriage.

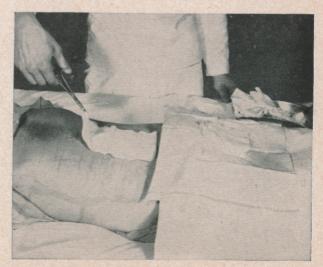


Figure 146.—Applying Sterile Dressing.

- 15. Place instruments in container of soap solution.
- 16. Place clean towel and unused dressings in tray on bottom shelf of carriage.
- 17. Make your patient comfortable, straighten his unit.
  - 18. Wash your hands!

## To use vaseline gauze:

1. Using technique forceps, remove a thumb forceps from the instrument tray. Replace technique forceps.

2. Cautiously tear open marked end of foil-

packaged vaseline gauze.

3. Remove strips from package with thumb forceps and place on patient's sterile field.

4. Using two forceps, arrange vaseline gauze on wound.

# To remove suture or clips:

1. Add scissors to equipment.

2. Follow steps given under Changing Dressings.

3. Paint suture line with tincture of Merthiolate or solution ordered by the doctor.

- 4. Slip scissors under suture and clip close to the skin.
- 5. With thumb forceps, grasp suture knot and remove. Place suture on a 4 x 4. When all sutures are removed place gauze and sutures in dressing basin.
  - 6. Clean incision with alcohol.
  - 7. Proceed as for Changing Dressings.
- 8. Clips are removed in the same manner using a clip remover instead of scissors.

# ASSISTING DOCTOR WITH DRESSINGS

#### PREPARATION:

- 1. Check with the doctor; list all patients who are to be dressed.
- 2. Check the carriage. Keep enough supplies on hand to do these dressings. Is there a need for any special equipment?
  - 3. Have a plan for dressings:

Do clean, closed wounds first.

Do clean, open wounds next.

Do contaminated or infected wounds last.

4. Inform those patients who are to be dressed.

## PROCEDURE:

1. Follow steps of Changing Dressings.

2. Doctor will clean and inspect wound. Pay

strict attention to the progress of the dressing; anticipate the doctor's needs.

3. Doctor will follow the same general outline as described in Changing Dressings.

# Charting—Nursing Notes

Record: Time, type of dressing, location of wound, solution used, condition of the wound, and signature.

# ATTACHMENT OF DRESSINGS

Dressings are generally held in place by *adhesive* tape. From adhesive are made three different types of dressing attachments:

Strips—Straight pieces of tape of varying widths which hold dressings in place and provide support to the wound.

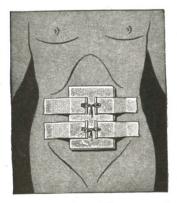


Figure 147.—Applying Montgomery Straps.

Montgomery straps—tie straps which are used when the dressing must be changed frequently.

To make Montgomery straps: Cut adhesive of the desired width in 6 to 10 inch strips, the number and length depending upon the size of the dressing to be held in place. Fold 2 inches of strip back on itself. Puncture or cut a small hole in this fold.

To apply Montgomery straps: Place smooth side of strip on dressing, then fasten adhesive side to patient. Repeat with other strips. Thread bandage through holes in strips, tie in center. Elastic bands are sometimes used. Insert an applicator stick slightly wider than the adhesive and fold strip back on itself. This type of dressing attachment is useful in chest dressings since it permits the dressing to "give" when patient inhales.

Butterfly—is a small piece of tape used to bring skin edges together. The adhesive must be flamed when used over wound.

To make butterfly tape: Cut a 4 inch length of 1 inch adhesive, fold adhesive tape lengthwise, cloth sides together. Narrow strip in the center by cutting out small piece.

To apply butterfly tape: Light an alcohol lamp. Pass the tape back and forth through the flame of the lamp, cloth side down, until the plaster bubbles. Allow the plaster to cool. Attach tape to one side of the wound, press edges of wound together, attach tape on other side of the wound.



Figure 148.—Flaming Adhesive.

Other means are also available, other than adhesive tape, to hold dressings in place:

Cellulose tape—This tape is used for small dressings, particularly for eye and face dressings.

Liquid adhesive or collodion—This adhesive is used for small dressings, particularly scalp dressings.

## APPLICATION OF BINDERS

A binder is a wide bandage or piece of cloth used to protect and to hold a dressing in place, to apply pressure, to give support, and to add to the patient's comfort.

Tailed—many tailed (scultetus) for abdominal or chest dressings. T or double T—for perineal or rectal dressings.

Straight—for chest or abdominal dressings. When applying binders: Be sure binder is smooth under the patient; insert pins at right angles to the pull of the material; avoid placing pins over bony prominences or areas that may cause pressure.

## Many Tailed

Place binder under patient.

Starting at lowest tail, lap tail one over the other to the top. Pin in place.



Figure 149.—Applying a Scultetus Binder.

# T Binder (Female Patients)

Place the cross bar of the T around the patient's waist.

Bring long bar of the T around perineum to cross bar in front. Pin with safety pin.

# Double T Binder (Male Patients)

Place the cross bar of the T around the patient's waist.

Bring double strips of T around perineum, each side of scrotum to cross bar in front. Pin with safety pin.

## WOUND IRRIGATIONS

#### PURPOSE:

To wash out a wound; to remove debris, pus.

## EQUIPMENT:

Sterile solution basin

Amount of sterile solution ordered at 105° F. Sterile bulb syringe

Sterile curved basin

## PROCEDURE:

- 1. Wash your hands!
- 2. Tell patient what you are going to do.
- 3. Screen patient.
- 4. Ask patient to turn on his side.
- 5. Place covered rubber sheet under the part to be irrigated.
- 6. Remove dressing as directed in Changing Dressings.
  - 7. Place curved basin under wound.
- 8. Fill bulb syringe with solution; gently irrigate the wound.

- 9. Note character, odor, and appearance of discharge.
- 10. When all solution is used, apply a fresh dressing.
- 11. Make patient comfortable, straighten unit.
- 12. Clean, wash, and boil equipment. Return equipment to CDR for autoclaving.

# CARE OF THE PATIENT ON THE ORTHOPEDIC SERVICE

Review—Chapter II, "The Skeletal System"

"The Muscles"

Unit II, "Basic Nursing Care"

Patients on the orthopedic service are those who require treatment of fractures, deformities and diseases of the musculoskeletal system. Some patients require surgery and immobilization to correct their conditions, others require immobilization, bed rest and re-education.

The usual orthopedic patient is in good general physical condition and is a bed patient only because the treatment prescribed for his local condition limits his movements. This patient usually is a long-term patient, his hospital stay may extend over many months.

The care of the orthopedic patient may be considered as being in two stages:

- 1. The period of immobilization—when the patient is in a cast, traction, frame or brace. Sound basic nursing care at this time is most important.
- 2. The period of re-education—when the patient re-learns how to use his muscles under the direction of the Physical Medicine Department. Cooperation of the nursing personnel with the Physical Medicine Department is most important at this time.

## What the Corpsman Should Know

- 1. How to take care of the patient with the appliances used for his treatment.
- 2. How the patient's orthopedic condition limits his movements.
- 3. The amount and type of activity the patient is permitted.
- 4. The amount and type of treatment the patient is receiving in other departments.

## THE PATIENT IN A CAST

Casts may be applied to extremities to immobilize one or more joints. *Example*: below knee

cast to immobilize ankle joint; above knee cast to immobilize ankle and knee joints. Casts may be applied to the body to immobilize lower trunk and one or both legs; to immobilize head and upper trunk or to immobilize trunk only.

# Assisting with Application of Cast

#### **EQUIPMENT:**

Examining table

Buckets of tepid water

Large bandage scissors

Rolls of plaster bandage of desired width, according to doctor's preference

Stockinet or sheet wadding

Felt padding

Newspaper

#### PROCEDURE:

## Preparation of patient and unit:

- 1. Explain the procedure to the patient.
- 2. Cleanse and thoroughly dry the part to be encased.
- 3. Spread newspaper on floor under and around table
- 4. Place the patient in position desired by doctor.

## Preparation of plaster:

- 1. Remove paper wrapper from roll.
- 2. Place roll on end in bucket. Allow roll to remain undisturbed in water until bubbles stop rising.
- 3. Grasp both ends of roll, lift from water and slowly squeeze until water stops dripping from roll. Do not twist roll.
- 4. Prepare rolls so that two or three are soaking while one roll is being applied.

5. Change water in buckets after every six to eight rolls. (When water is too heavily saturated with plaster the rolls do not soak properly.)

# Application of plaster:

Part to be encased is covered by stockinet or sheet wadding.

- 2. Felt pads are cut to fit bony prominences.
- 3. Doctor applies plaster rolls while corpsman holds part in desired position.
- 4. The patient remains on the table until cast is set.

## Immediate Care (first 24 hours)

1. Prepare the bed for the patient.

Place fracture board under mattress.

Place rubber covers on pillows to be used to support cast.

- 2. Lift patient carefully from stretcher to bed.
- Do not roll patient.
- 3. Use the palms of hands when lifting a damp cast. Avoid using fingers—fingers cause depressions in cast which in turn cause pressure areas.

CAUTION: Quick drying or baking should not be attempted without a doctor's order. Cast may dry on the outside and patient may be burned by the moist heat generated inside the cast. A cast may take from several hours to 2 to 3 days to dry.

4. Place the encased part on rubber covered pillows. Support the cast its entire length.

Cast extremity—support on inclined plane. Cast on body—use enough pillows to support the entire body.

- 5. If cast is on an extremity—leave it exposed. If cast is on the body, screen patient, cover the pubes and leave cast exposed after patient has completely recovered from anesthetic or shock.
  - 6. Watch patient closely.

If patient has had surgery—treat as a postoperative patient. Be alert for signs of shock or hemorrhage.

All patients—report any complaint of pain or pressure at once—do not wait!

## Cast on extremity:

Inspect fingers or toes of the encased extremity frequently for pallor, blueness, swelling, or coldness. Does the skin show a slow return to pink where you press it with your fingers?

Take the pulse of exposed fingers or toes of the encased extremity.

Does the patient complain of a burning sensation? Does the patient complain of tingling, pressure, pain? What is the location of complaint? Cast on body:

Is the cast pressing anywhere: on chest, groin, buttocks, or knee?

Does the patient have difficulty breathing?

#### Later Care

1. Patient with cast on arm or leg:

Turn patient every 2 hours to allow all parts of the cast to dry.

2. Patient with body or spica cast:

Turn the patient for the first time 6 to 8 hours after application of the cast, then every 2 hours.

To turn the patient: Slide the patient on the pillows to the side of the bed. (Spica always turn with operated hip uppermost.)

Place rubber-covered pillows along the length of the cast.

Ask the patient to raise his arms above his head.

With help and at signal turn the patient over on his abdomen onto the pillows.

Fold a pillow and place it under the feet to relieve pressure of toes on the bed (in spica cast, one foot should be off the mattress when patient is on his abdomen).

Protect the cast about the buttocks and perineal area with oiled or plastic material.

Check condition of patient's skin under the cast frequently.

Be alert for possible pressure sores.

Reach under cast while patient is on his abdomen and wash his buttocks and back; rub well with alcohol.

Smell the cast frequently for moldy, putrid, or other abnormal odors. Pressure areas may often be first detected by odor.

Check supports: Is the patient's entire body supported on the same plane as the encased parts?

Check elimination: Abdominal distention and constipation are fairly common complications for the first week after a body cast is applied.

3. Smooth rough edges of cast after is is completely dry:

Pull out stockinet lining and tape it to the outside of the cast, or petal edges:

Cut 2-inch adhesive in 12-inch strips.

Fold tape lengthwise, cloth sides together.

Cut 2-inch pieces at 45° angles.

Open petal, place single point outside cast, double point inside cast. Overlap petals about entire edge of cast.

- 4. Watch for signs of cast cracking.
- 5. Encourage the patient to exercise as much as possible in preparation for crutch walking. These bed exercises may be in the form of lifting dumbbells, doing "pull ups" on the balkan frame trapeze, or "push ups" on bed.

## Removal of Cast

- 1. Transfer the patient to a stretcher or table if possible.
- 2. Place newspapers or rubber sheet under the cast.
- 3. Moisten cast along the cutting line with hydrogen peroxide or vinegar (apply solution with a medicine dropper or bulb syringe).
  - 4. Cut cast.
- 5. Remove top half of cast, return patient to his bed.
- 6. Lift limb out of cast, place limb on pillows, supporting its entire length.

## After Removal of Cast

- 1. Remove all plaster crumbs from bed.
- 2. The limb will probably be covered with a yellow crust and be odorous. Avoid attempting to remove this crust by vigorous scrubbing or rubbing, it is a protection for the skin. Gently wash the limb with a mild soap and water. If a new cast is not to be applied, cocoa butter or a similar substance may be used to soften this exudate.
- 3. The patient may complain of soreness and discomfort in the limb for several days after the cast is removed. This is because the muscles of the limb are weak and have lost the support of the cast.
- 4. The cast shell may be used to support the limb at night. If so, smooth rough edges of cast, replace lining, clean cast. Montgomery straps may be used to hold the cast in place.

## THE PATIENT IN TRACTION

## Types of Traction

- Skeletal traction is applied directly to the bone by tongs, pin, or wire connected to weights and pulleys.

Skin traction is applied to the skin by the use of heavy adhesive tape connected to weights and pulleys.

#### PROCEDURE:

## Preparation of patient and his unit:

- 1. Place the patient in a bed having a fracture board under the mattress and a Balkan frame overhead.
- 2. Check with the doctor as to the type of splint, frame, attachments, and traction he will use. If skeletal traction is to be used, the area is prepared as for a surgical operation. If skin traction is to be used the area should be shaved. Tincture of benzoin may be applied to protect the skin and improve the sticking qualities of the adhesive.
- 3. Bring the orthopedic cart and other necessary equipment to the bedside.
  - 4. Assist the doctor as required.

#### Later Care

1. The angle of traction must be maintained. Shock blocks under the head or foot of the bed may be used to keep the patient in position.

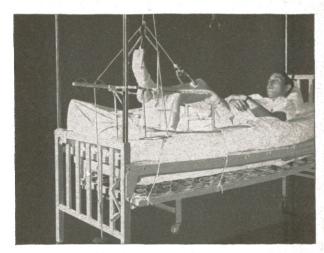


Figure 150.—Patient in Traction.

- 2. The weight of traction must be maintained. Check weights frequently. Are the weights hanging free? Are the ropes in the pulley groove?
  - 3. Traction on arm or leg:

Is the hand or foot supported? The foot should be at a right angle to the leg, hand should be supported in a functional and correct anatomical alignment.

Check adhesive in skin traction. Is it slipping? Is it wrinkled? Check the pins or wires and condition of the skin in skeletal traction. Are the pins resting on the splint? Are

the ends of the wire covered by corks or adhesive?

Support the free foot by a footboard.

- 4. The patient should be comfortable once the traction is applied. If he is not, something is wrong. Recheck items listed in this section and look for additional possible causes of his discomfort.
- 5. Encourage patient to do bed exercises in preparation for crutch walking.

## CRUTCH WALKING

# Types of Crutches

Aluminum cane type—has mid-forearm supports. Height is adjusted in shaft of crutch.

Wooden type—has axillae and hand bars. Height is adjusted in shaft and hand bars of crutch.

## Measurement of Crutches

Aluminum cane type: Have patient stand against a wall; adjust height of crutch so that when patient leans on crutch his elbows are in 30° flexion, hands are flat on hand bars, and crutch is 4 inches out from the side of his heel.

Wooden type: Have patient lie flat in bed, hands at sides; using a tape measure, measure from the border of the axilla to 6 inches out from the side of his heel; adjust height of crutch to this measurement; place crutch in same position you had tape measure; ask patient to place his arm over the crutch and grasp hand bar so that patient's elbows are in 30° flexion and the palm of hand is flat on hand bar.

## Teaching the Patient

The type of crutch walking the patient is to use will be ordered and demonstrated by the doctor. It will depend upon whether or not the patient is permitted to bear weight on the injured leg, and whether crutches will be used temporarily or over a long period of time. Whenever possible, crutch walking should be taught by the Physical Medicine Department.

1. The most common type of crutch walking for short-term use is the "swing through" gait. The patient bears weight on his good leg, places the crutches at an equal distance ahead of him and then swings to a position just ahead of the crutches. Weight is shifted to the hands and then back to the good leg.

- 2. Allow patient to practice bearing his weight on the palms of his hands while standing at the side of the bed.
- 3. Stand in back of the patient when he is learning to use crutches. If he begins to fall, bring him back against your body for support.

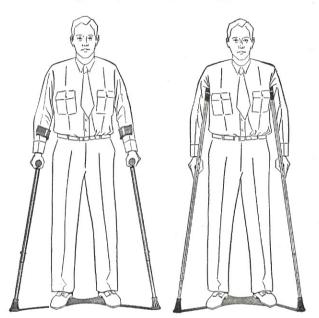


Figure 151.—Aluminum Cane Type Adjustable Crutch.

Figure 152.—Wooden Adjustable Crutch.

#### Caution patient:

- 1. To wear shoes when crutch walking.
- 2. To try to establish a rhythm, take small steps and to look straight ahead when walking.
- 3. To place crutches ahead and to the side of his body to provide a broad base of support.
- 4. To bear weight on palms of hands, not on the arm rests. (Paralysis of the radial nerve may result if weight is borne on the axillae.)
  - 5. To avoid wet, slippery or highly waxed floors.
- 6. To use the crutches for short periods of time and for short distances until he is accustomed to them and does not become tired.

Shafer, K. N., Sawyer, J. R., McCluskey, A. M., Lifgren, E. E.: *Medical—Surgical Nursing*. St. Louis, C. V. Mosby Co., 1958.

Rapier, D. K., Koch, M. J., Moran, L. P., Fleming, V. L., Cady Jr., E. L. and Jensen, D. M. (Ed.): *Practical Nursing*. St. Louis, C. V. Mosby Co., 1958. Unit IV, Part IV; Units VII, XII, and XIV.

Young, H., Lee, E. and Associates: *Essentials of Nursing*. 3d ed. New York, G. P. Putnam's Sons, 1953. Pp. 481–505.

Check current issues of periodicals for information on care and treatment of your patients. Periodicals available at most stations:

Armed Forces Medical Journal. American Journal of Nursing.

# WARD MANAGEMENT-UNIT V

## Review——BUMED INSTRUCTION 6010.3A

Manual Medical Department, Chapters 11, 22, 23

## Local Station Instructions

A ward is a unit of a hospital composed of a number of beds and other equipment necessary to provide service to and for the patients assigned to it.

Ward management is the direction, guidance, and supervision of ward personnel and their activities toward the goal of giving the best possible care to the greatest number of patients.

The management of a hospital ward is ordinarily the delegated responsibility of a Nurse Corps officer. In executing her responsibilities as ward manager, the Nurse Corps officer:

- 1. Defines and assigns duties to the corpsmen and patients by means of detail lists.
- 2. Establishes routines and schedules for ward activities.
- 3. Keeps records and reports as required by the Manual of the Medical Department and local hospital instructions.
- 4. Maintains adequate supplies and equipment on the ward.

In a sick bay aboard ship or in the absence of a Nurse Corps officer, the responsibility for ward management is delegated to the senior hospital corpsman present. The management of a sick bay follows the same general pattern as that of a ward.

Detail list.—A corpsman's detail list is made out and posted on the bulletin board. The list should:

- 1. Be clear, concise, and complete.
- 2. List all ward activities (patient care, house-keeping, errands, relief, and so forth).
- 3. Divide the activities into evenly distributed work loads equal to the number of corpsmen assigned to the ward.
- 4. Assign each corpsman according to his ability and experience.
- 5. Rotate assignments so that each corpsman will gain experience in all phases of patient care available on the ward.

## Orientation of New Corpsman

- 1. Introduce him to his fellow workers.
- 2. Take him around the ward; introduce him to

the patients and show him where supplies and equipment are stored.

- 3. Find out what experience he has had, what experience he lacks.
- 4. Discuss the ward routines, detail lists, and assignments with him.
- 5. Supervise his work closely until he demonstrates his ability to carry out assigned duties dependably.

## WARD ROUTINES AND SCHEDULES

Each ward will necessarily have to adapt routines and schedules according to the type of patients assigned to it. It is recommended that the routine for medications and treatments as outlined in Unit III be adopted and adapted to all situations where practicable.

# Sample Routine—Day

0700–0800 Morning care. Serve breakfast.
Turn off unnecessary lights.

Make out necessary ward records (person in charge of ward).

Prepare all records, reports for doctor's signature at sick call.

0800 Start morning care to patients, such as baths, treatments, and medications.

Start patients' cleaning details. Begin in doctor's office, examining room, etc., and work toward ward proper.

0900 Morning sick call by ward medical officer, Nurse Corps officer, senior hospital corpsman. Carry out "stat" orders. Other corpsmen carry on assigned duties.

1100 Weather permitting, ventilate ward; protect patients from drafts.

1130–1230 Serve dinner. Ward corpsmen go to dinner. One-half of crew goes each period.

1300–1400 Rest hour for patients. Check charts, orders, Nursing Care Plans, and make out specimen requests.

1400–1600 Visiting hours. Carry out necessary nursing care of patients.

1630-1700 Serve supper.

1800 Evening care to bed patients.

1900 Evening sick call—Officer of the day, Nurse Corps officer, and senior corpsman. Carry out "stat" orders.

2000 Distribute specimen containers; start settling ward for the night.

Distribute bedpans and urinals to bed patients as needed.

Distribute extra blankets.

Adjust windows for ventilation.

Turn out overhead lights; turn on night lights.

Check patients for any last minute needs.

2045 Check and see that head, shower, linen, utility rooms and ward galley are clean and in order.

2100 Give report and special orders to relieving night corpsman.Off duty.

## Sample Routine—Night

2050 Report for duty. Receive report from day corpsman and p.m. Nurse Corps officer.

Discuss and understand all reports, orders, and duties.

Make actual bed check against ward roster and liberty list.

2100 Send muster report to night master at arms.

Start Night Report (NAVMED 1367).

Check orders with night Nurse Corps officer; find out how to contact her when needed; notify her of any patient's complaints, change in condition, any unusual happening on ward.

2130 Organize work for the night. Note or make a memorandum of medications, treatments, nursing care to be given during the night, cleaning details (hypo and thermometer trays, solarium, dressing cart) to be done.

Plan to make frequent rounds during the night. At least hourly on entire ward and more often to seriously ill patients.

Record in Night Report after each round. Record in patient's charts all observations as they occur, medications and treatments after they are given.

0100 First watch to supper.

0130 Relief watch to supper.

0530 Quietly organize work and equipment for morning duties.

0630 Lights on. Reveille.

Medications and treatments as ordered. Collect specimens; record on patients' charts.

Complete and sign Night Report and patients' charts.

Straighten service rooms, desks nurses' station.

0700 Give report to day corpsmen.

Take specimens to laboratory.

Off duty.

At stations not using the Visible File Book system, all notations indicated for the Ward Data Record, Nursing Care Plan and Night Report, are recorded in the Ward Report Book.

## Sample Routine of Special Watch—Night

2050 Report to Nurse Corps officer.

Receive and understand patient's orders.

Take complete care of patient.

Note medications and treatments, nursing care to be given, observations to be made.

Check your plan of care with the Nurse Corps officer.

Start patient's chart. Record all observations, medications, and treatments as they occur or are given.

0130 To supper when properly relieved.

0600 TPR, medications and treatments as ordered.

Give complete bath, change linen, and clean and straighten room or unit.

0645 Complete and sign patient's chart.

0700 Give report to relief corpsman and

day Nurse Corps officer in charge of ward.

Take specimens, if any, to laboratory. Off duty.

NOTE: The routine of corpsman on special watch during the day follows the same general outline.

## Sample Cleaning Schedules

# Daily Cleaning

#### Floors:

- 1. Sweep down after meals, using sweeping compound. Wet-mop stone, unpolished wooden and linoleum floors.
  - 2. Buff floors each morning.
- 3. Scrub shower and head floors each a.m. and p.m.
  - 4. Scrub galley floor each a.m. and p.m.

#### Bedside units:

- 1. Damp-dust lockers, beds, chairs, lamps, window sills each a.m.
- 2. Line up beds, chairs, lockers each a.m., p.m., p.r.n.

#### Service rooms:

- 1. Clean sinks, hoppers, working surfaces each a.m. and p.m.
  - 2. Mop floors each a.m. and p.m.

## Weekly Cleaning

#### Monday:

- 1. Routine daily cleaning.
- 2. Damp-dust vents, signal buzzers. Dust electrical fixtures.
  - 3. Clean radiators, electric fans.
  - 4. Clean wheel chairs and special equipment.

#### Tuesday:

- 1. Routine daily cleaning.
- 2. Wash beds, springs, and mattresses, chairs, inside and outside of lockers.
  - 3. Polish bright work.

#### Wednesday:

- 1. Routine daily cleaning.
- 2. Dust screens with a brush.
- 3. Wash windows and venetian blinds.
- 4. Dust walls with cleaning cloth attached to a long-handled broom.

## Thursday:

Field day—any day before inspection.

- 1. Routine daily cleaning—wax floors. (Exception: orthopedic wards.)
- 2. Clean medicine lockers, cabinets, desks, cupboards.
- 3. Wash stretchers, wheel chairs, irrigating stands, screens, overbed tables.
- 4. Clean gear, gear lockers, racks. Mops should be "twirled and spread out" to dry (in sun if possible). Clean brooms and dust pans.
  - 5. Check all cleaning details.

## Friday:

- 1. Routine daily cleaning.
- 2. For captain's inspection, open lockers, cabinets, desk drawers. Align beds, chairs, lockers. Open windows evenly; line up venetian blinds or shades.

# Saturday and Sunday:

Routine daily cleaning.

Ward routine and cleaning schedules may be modified in different stations due to local conditions.

# Sample Routine for Inspection

Ward is in order and all patients are present unless excused by ward medical officer.

Ward medical and nurse officers and senior corpsmen stand at entrance to the ward. Other personnel continue with assignments.

## Duties of senior corpsman:

- 1. Stand at entrance to ward equipped with a flashlight, ward keys, and a hand towel dampened with water at one end.
- 2. On arrival of the inspection party, call the ward to attention.
- 3. Precede the inspection party; turn on lights, open doors as the party progresses through the ward.
  - a. Adjust the pace of the inspection to the desires of the inspecting officer.
  - b. Offer the dampened towel for the inspecting officer's hands when needed.
  - c. Be prepared to answer questions concerning the patients and the ward.
  - d. Be attentive to all suggestions made by the inspecting officer.
  - e. Escort the inspection party to the exit of the ward.
  - 4. When the inspection party has left the ward,

announce "Carry on." Continue with ward routine.

## WARD RECORDS AND REPORTS

Ward records and reports may be divided into two classifications:

1. Records and reports used in the internal operation of the ward, such as:

Ward Report Book or Visible File Book

Doctor's Order Sheets

Oral Report at Change of Watch

Ward Roster

Diet List

Narcotic Book/Record

Temperature-Pulse-Respiration Book

2. Records and reports prepared by the ward for other departments:

Ward Report (NAVMED 9)

Diet Sheet (NAVMED 18)

Laundry List (NAVMED 21)

Drug Order Book/Record

Consult station instructions for additional records or reports required and for the disposition of completed records or books.

# Records and Reports Used on Ward Ward Report Book

#### PURPOSE:

To provide a record of ward activities for the information of corpsmen, doctors, and nurses.

## INDICATED:

For all wards not using the Visible File Book system.

## Sample Form

Ward\_\_\_\_

Census @ 0700		@ 1500	@ 2200		
CLRAAOWTOWDDDD		CapOccVacSleeperLeave	Wa Port 0800-1200 1600-2100 Starboard 0700-1600  Night 2100-0700		tch List
Narcotics{1	1500	_(Signatures)	_NC		P.M. Sickcall
(;	2200		_NC	(	Signature) O.O.D
A	(Name)	(Rank or Rate)	1	gnosis)	Signature) O.O.D
A	(Name)	I .	(Diag		From Ward to Ward
A	(Name)	(Rank or Rate)	(Diag	gnosis)	From Ward
	(Name)	(Rank or Rate) (Rank or Rate)	(Diag	gnosis)	From Ward

## Body of Report

- 1. Record patients on the critical and serious lists, new admissions, and others requiring special care.
- 2. List their conditions, nursing care required, and any special information the other watches should know.

# Example

Port Jones, John J. HA Diagnosis
1. Appears slightly improved.

C.L. 2. Give oral hygiene and back care q2h.

Sp. W. 3. Change position q2h.

- 4. Restrict visitors to parents.
- 5. Watch voidings; measure and record intake and output.
- 6. Patient is allergic to codeine!
- 3. List names and bed numbers of the patients who are to have a.m. care; are to have specimens collected; are to have special tests requiring delayed breakfasts, and so forth; require special care.
- 4. Record any unusual happening on the ward such as patient falling out of bed, fist fights.
- 5. Night watch will record after each round: Changes in patient's condition; completion and check-off of assignments listed in 3 above; names of unauthorized absentees.
- 6. Ward Report Book must be signed by the person in charge of the ward (Nurse Corps officer or senior corpsman) on each watch.

#### Doctor's Order Sheet

#### PURPOSE:

Date

To provide a method of notification and execution of the doctor's orders.

#### **EQUIPMENT:**

File board or chart holder

Notification Sheet (paper ruled for date, patient's name)

## PROCEDURE:

- 1. Place the notification sheet on the file board or chart holder. Keep the board or chart holder on the desk so that the sheet is clearly visible and readily available to all doctors visiting the ward.
- 2. When the doctor writes and signs an order on the Doctor's Order Sheet (SF 508), the date and patient's name is entered on the notification sheet.
- 3. The corpsman or Nurse Corps officer initials the order in the patient's chart and crosses the

patient's name off the notification sheet when the order has been noted and executed.

#### Sample Form

#### NOTIFICATION SHEET

Date	Patient	Date	Patient	Date	Patient

## Oral Report at the Change of Watch

#### PURPOSE:

To report the ward activities and the conditions of the patients to the personnel of the new watch.

#### EQUIPMENT:

- 1. Ward Report Book or Visible File Book
- 2. Patient's charts

#### PROCEDURE:

- 1. Have nurses' station quiet and in order.
- 2. Have all personnel of the new watch present for the report.
- 3. Use the Visible File or the Report Book and the patients' charts.
- 4. Give the status of the ward from the headings of the Ward Report Book or Ward Data Record.
- 5. Report all new orders directly from the Doctor's Order Sheets. Report the condition of each patient.
- 6. Give any other information the new watch will need to know.
- 7. Discuss problems or procedures which have arisen or may arise.

Remember the team carries on for the entire 24-hour period!

## Ward Roster (Alphabetical)

#### PURPOSE:

To maintain an accurate list of all patients on the ward.

## PROCEDURE:

Arrange and maintain the ward copies of the Admission Records (NAVMED 1285) in alphabetical order in the Visible File Book or in a card file.

## Diet List

#### PURPOSE:

To serve the proper food to each patient.

#### **EQUIPMENT:**

Blank sheet of paper, 8 x 5 card, or blackboard in diet kitchen.

#### PROCEDURE:

- 1. List all patients who are to be fed on the ward and in the mess hall.
  - 2. List patients under the appropriate columns.
  - 3. List type of diet under special diets.
- 4. Designate those patients who are to have nourishments by a capital N after their names.

## Sample Form

Mess hall
quid Special

#### Narcotic Book/Record

#### PURPOSE:

To maintain a permanent accurate record of narcotics on the ward.

## **EQUIPMENT:**

Narcotics may be recorded in a ledger or loose-leaf book. Each page should be divided into columns for date, hour, patient's name, each narcotic on ward, doctor's name, nurse's name.

Each narcotic charged to the ward must be accounted for and an entry must be made:

- 1. Each time a new supply is received from the pharmacy.
  - 2. Each time a narcotic is given.
- 3. Each watch following a complete narcotic count.
- 4. Each week or as specified by local instructions showing totals of narcotics received, dispensed, and remaining on hand. These totals must balance.

# Temperature—Pulse—Respiration (TPR) Book

#### PURPOSE:

To provide a temporary record of the temperatures, pulses, and respirations (TPR) of all patients on the ward; to use when taking temperatures, pulses and respirations.

#### **EQUIPMENT:**

The TPR book may be a 5 x 8 or 10 x 14 ledger book, depending upon the number of patients on the ward and the frequency in which recordings must be made.

#### PROCEDURE:

- 1. Place name of ward and date at top of page.
- 2. Rule page into columns for bed number, name of patient, and the number of columns needed for recording the temperature, pulse, and respiration.
  - 3. List bed numbers in numerical order.
- 4. List patients' names according to their placement on the ward.
- 5. Place a check mark next to the patients' names who are to have q4h or qid recordings.

## Use of book:

- 1. Record all TPR's.
- 2. Circle elevations of temperatures of 100° F. or over with red pencil.

# RECORDS PREPARED FOR OTHER DEPARTMENTS

# Ward Report (NAVMED 9)

#### PURPOSE:

To provide a correct daily patient census; to show a daily change in census.

## INDICATED:

For all wards.

## PROCEDURE:

Send to record office by 0830 daily—The Ward Report is used as a basis for filling out Form 10 by the record office. It may also be used by the agent cashier for meal checkage. The report must be accurate, complete and legible. The report covers a 24-hour period (0001 to 2400).

The heading of the report shows the numerical census and change in census.

The body of the report lists the names, rates and diagnoses of the changes which occurred in the previous 24-hour period.

Both sections must be in complete agreement. The Census Last Report must agree with the total remaining from the last Ward Report. All changes in the patient census should be listed as they occur. Check local instructions for any additional information required at your station.

## Diet Sheet (NAVMED 18)

#### PURPOSE:

To obtain adequate foods from Food Service for the patients.

#### INDICATED:

For all wards.

#### PROCEDURE:

Send to diet kitchen by 0830 daily—Be sure to order enough diets for all your patients but do not pad the requisition. Fill in the top section of the sheet as directed on the form; specify the number of patients eating on the ward or in the mess hall for all diets. In the body of the report list by name those patients on other than regular diets. Specify type of special diet and whether it is to be served on the ward or in the mess hall.

In some stations a handicapped mess is maintained. If such is the case, list the names of those patients who are to eat in this mess.

Check station instructions for additional information required on sheet and directions for ordering nourishments and staples.

# Laundry List (NAVMED 21)

#### PURPOSE:

To order linen from linen room.

#### INDICATED

For linen exchange on days specified in station instructions.

## PROCEDURE:

Send to linen room on days and at times specified.

The Laundry List is made out in duplicate. The original goes to the laundry or linen room with the soiled linen. The copy is retained by the ward. The linen is counted and totals placed in appropriate columns. The linen returned from the linen room is checked against the ward copy of the Laundry List. Cleaning cloths, binders, and other items of linen not listed are written in on blank sections of the sheet.

# WARD SUPPLY AND EQUIPMENT

The supply and equipment for ward use is classified as follows:

Expendable—Those items that are consumed in use, break easily or are inexpensive, such as paper, glassware, plastic drinking tubes.

Nonexpendable—Those durable items, such as furniture, instruments, vehicles.

# Ordering Supplies and Equipment

Request for Issue and Turn-In (DD Form 1150) is used for expendable and nonexpendable items. Follow local station instructions for the use of the form.

When ordering expendable items:

Request sufficient amounts to last until the next ordering day.

Base order on the rate of use of the item.

Know the number of items in each ordering unit. Example: The ordering unit for Ward Report is 1 pad. Each pad contains 100 report blanks; therefore 1 unit should be enough for a 3-month supply.

# Care and Use of Supplies and Equipment

All ward personnel and patients are charged with the conservative use of government materials. The custody of nonexpendable items is charged to the ward medical officer but all personnel and patients should endeavor to keep this equipment on the ward and in good condition.

#### Metalware

## General instructions:

- 1. Rinse with cold water.
- 2. Wash with warm soapy water.
- 3. Boil 20 minutes.
- 4. Use mild scouring powder or sand soap for removing stains.
  - 5. Rinse with hot water; dry.
  - 6. Stow in proper place.

## Points to remember:

- 1. Acids, bichloride of mercury, and chloride of lime corrode and stain steelware (CRM ware).
  - 2. Enamelware chips easily.
- 3. Metalware dents easily when dropped or banged.

#### Bedpans and Urinals

1. Cleansing by automatic bedpan sterilizers. Place in apparatus; push flush lever.

After flush, press steam lever for 1 minute. Carry out steps 4 through 6 in instructions given above.

2. Manual cleansing.

Rinse with cold water.

Clean with brush and soap solution under running water.

Rinse well with hot water.

Boil in utensil sterilizer 20 minutes.

Stow in rack.

#### Instruments

- 1. Rinse in cold water.
- 2. Separate blunts and sharps; unclasp hinged instruments.
- 3. Wash in warm soapy water; use brush and sand soap as needed for serrated parts.
- 4. Dry carefully. Reassemble hinged instruments; oil binges very lightly.
  - 5. Stow in cabinet.

#### Glassware

#### General instructions:

- 1. Rinse with cold water.
- 2. Wash with warm soapy water to which ammonia has been added (4 cc. to 1,000 cc. water).
  - 3. Inspect for chips and cracks.
  - 4. Stow in proper place.

#### Points to remember:

- 1. Survey all chipped or cracked glassware.
- 2. Never boil a syringe with plunger in barrel.
- 3. Wrap glassware in gauze or muslin, when sterilizing by boiling, to prevent breakage.

## Tubing, Connecting Tips

- 1. Soak in hydrogen peroxide if coated or blocked with organic residue.
  - 2. Use cotton applicators to clean inner surfaces.

#### Syringes

- 1. Separate barrel and plunger after rinsing with cold water.
- 2. Soak in dilute hydrochloric acid for 20 minutes if syringe is clouded or sticky.
- 3. Use a small bottle brush or cotton applicator to clean the barrel.
- 4. Match barrel and plunger according to number etched on the sides.

## Rubber Goods

#### General instructions:

- 1. Wash with cool soapy water; rinse well with clear water; dry thoroughly.
  - 2. Roll or hang in cool place.

## Points to remember:

- 1. Oil, heat, soap, cresol, and sunlight deteriorate rubber.
  - 2. Rubber goods must be dry when stored.
- 3. Do not dry rubber goods over a radiator or store near hot pipes.
  - 4. Always roll rubber sheets; never fold them.
- 5. Always remove clamps from tubing before boiling.

# Tubing, Catheters, Rectal Tubes

- 1. Rinse under cold running water.
- 2. Wash with cool soapy water; rinse.
- 3. Use cotton applicators if needed, to clean openings (eyes) of catheters and tubes.
  - 4. Wrap in gauze; boil for 5 minutes.
  - 5. Dry, drain, stow in coils without kinks.

# Hot Water Bottles, Ice Bags

- 1. Wash with warm soapy water; rinse with clear water; dry; drain.
  - 2. Inflate bag; apply cap.
  - 3. Stow in cool place (preferably hanging up).

#### Air Rings

1. Rinse with cold water; wash with warm soapy water; rinse with clear water; dry.

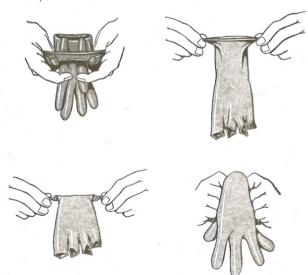


Figure 153.—Method of Inverting Rubber Gloves.

2. Inflate; powder lightly, and stow hanging up or flat in drawer.

## Gloves

- 1. Rinse in cold water.
- 2. Wash in warm soapy water; rinse; test for holes; dry; arrange in pairs.
  - 3. Send to Central Supply Room.

## Linen

## Control Supply

Keep linen locker in orderly arrangement, shelves clearly marked, linen neatly stacked.

Allow only staff personnel access to linen locker.

Keep linen locker locked.

Keep key on person.

Require ambulatory patients to obtain clean linen on exchange basis.

## Proper Use of Linen

Insist upon linen being used as intended, pillow case for pillow, towel for bathing the patient. Cleaning cloths may be obtained from linen room by requesting them on Laundry List.

#### Torn Linen:

- 1. If soiled, place in hamper for laundry.
- 2. If clean, fold with tear uppermost; put aside in linen locker. Send to linen room on specified day on an exchange basis.

## Protect Linen

- 1. Use rubber pillow cases and sheets when patient is incontinent, vomiting, hemorrhaging, has discharge, or wet dressings.
- 2. When stripping the bed, lift mattress with one hand and loosen bedding with other hand to avoid tearing sheets on bedsprings.
- 3. Remove stains before sending linen to laundry.



Figure 154.—Protecting Linen.

4. Obtain special linen from linen room for patients whose treatment causes staining of linen.

## Removal of Stains

## General:

Remove as soon as possible. Use simplest method first:

Stretch stained portion over sink or basin, stained side down; pour cold water through stain.

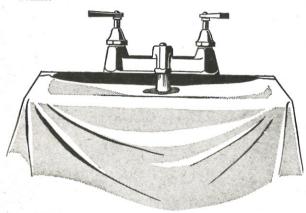


Figure 155.—Removing Stains.

## Blood stains:

Fresh—Same as above.

Old—Add ammonia to warm soapy water.

On mattress—Apply paste of talcum powder or starch; let dry; brush well. Repeat until stain disappears.

Feces: Same as in General.

Medicine: Pour cold water through stain; use alcohol for tinctures.

lnk: Apply salt paste; soak in lemon juice. Dry in sunlight.

Fruit: Pour boiling water through stain.

# Care of Cleaning Gear

## Wet Mops

- 1. Stow in mop racks outside the ward.
- 2. Wash with hot soapy water twice weekly.

## Push Brooms

- 1. Stow in gear locker, brush head up.
- 2. Use for dry sweeping or with compound.

## Dry Mops

- 1. Stow in gear locker, mop head up.
- 2. Send mop head to laundry weekly.

## Cleaning Cloths

- 1. Wash with hot soapy water after use.
- 2. Allow cloths to dry before placing them in the hamper.
  - 3. Obtain cleaning cloths from laundry.

# The Drug Supply of the Ward

The ward should be stocked with enough drugs to last 24 hours or over a week-end. Drugs should be stored in the medicine locker. Those drugs requiring refrigeration should be stored in the galley refrigerator.

## Care of Medicine Locker

- 1. Keep the medicine locker locked. The key should be carried by the corpsman in charge of medications.
- 2. Store narcotics in a separate locked cabinet within the medicine locker. The key must be carried by the Nurse Corps officer in charge of the ward.
- 3. Post a list of symbols, abbreviations, and equivalents on the inside of the medicine locker door.
  - 4. Cleaning the locker:

Wipe shelves daily when checking supply.

Start at the top; remove only a few bottles at a time.

Clean entire locker inside and out weekly.

CAUTION: If interrupted, be sure to return all drugs and lock locker before leaving.

- 5. Drugs requiring refrigeration are stored in one section of the refrigerator. They are: saline cathartics, oils, suppositories; sera, vaccines, antibiotics, and biologicals.
- 6. Arrange drugs within the locker in an orderly manner. Be sure all labels are plainly visible. Suggested arrangement:

# Upper section:

Top shelf—liquid for internal use.

Middle shelf—capsules, pills, powders; grouped according to their use.

Lower shelf—drugs to be used externally such as eye drops, nose drops, ointments. Narcotic locker containing all narcotics, barbiturates, mixtures containing opiates.

#### Lower section:

Left side, top drawer—drugs to be given by injection, and as emergency stimulants.

Left side, second drawer—sterile autoclaved syringes and needles, tourniquets, and covered container of alcohol sponges.

Right side, first shelf—oral medicine tray.

Right side, bottom shelf—poisons in poison bottles with poison labels.

# Maintenance of Drug Supply When ordering drugs:

- 1. Check drug supply in locker and refrigerator each morning before sick call.
- 2. Make out order in Drug Book/Record. Use intelligence in ordering; order according to the rate of use. The amount of drug you order will depend upon how often it is given, the size of the dose, and the number of patients receiving it.
  - 3. General rule to follow when ordering drugs:

If item is used in dosages of—	Order in quantities of—
Drop or minim	_ 10 to 30 cc.
4 to 16 cc	_ 100 to 250 cc.
16 to 30 cc	_ 500 to 1,000 cc.
30 to 100 cc. or over	_ 1,000 to 4,000 cc.
1 to 2 tablets or pills	_ 50 to 100 tablets or pills

4. Return to pharmacy:

All drugs in poorly labeled or unmarked

bottles or boxes.

All drugs not in current use.

All outdated drugs.

All drugs showing a change in color, odor, or consistency.

- 5. Make out prescription blanks for alcohol, narcotics, and other drugs as required by station instructions.
- 6. Present drug order and prescriptions for doctor's signature at Sick Call.
- 7. Send drug basket, drug order, and prescriptions to the pharmacy by 0930.

# References and Suggested Additional Reading— Unit V

Barrett, J.: Ward Management and Teaching. 2d ed. New York, Appleton—Century—Crofts Inc., 1954.

Nursing Administrative Procedures; Maintenance of Ward Records. BUMED Instruction 6010.3A, 1 July 1958.

Young, H., Lee, E. and Associates: *Essentials of Nursing*. 2d ed. New York, G. P. Putnam's Sons, 1948. Pp. 503–515.

# INTRODUCTION TO THE OPERATING ROOM AND CENTRAL SUPPLY— UNIT VI

The purposes of this section are to acquaint the general service corpsman with:

- 1. The preparation and sterilization of surgical supplies and equipment.
- 2. The preparation of the operating room for general surgery.

The methods and procedures outlined are those of several stations and therefore are general rather than specific practices. The corpsman is advised to refer to the local station instructions for routines pertaining to his particular situation.

# PREPARATION OF SUPPLIES AND EQUIPMENT

Review—Chapter III, "Wounds"

The preparation and sterilization of supplies and equipment have been consolidated in most Naval hospitals into a Central Supply Room (CSR) or a Central Dressing Room (CDR). The extent to which the CSR services the wards and clinics of these hospitals varies with the physical lay-out of the hospital, the size of the CSR, and the number of personnel assigned to the CSR. Where there is no CSR or where the use is limited, many of the activities described are carried out by the ward or clinic personnel.

## Rules for Handling Supplies and Equipment

- 1. The best available method of sterilization must be used in preparing supplies.
- 2. Contamination of sterilized supplies must be prevented.
- 3. Supplies must be thoroughly cleansed before sterilization or disinfection is attempted.
- 4. A sterile article must be labeled with the date of sterilization.
- 5. Supplies to be sterilized must be in good condition.
- 6. The transfer of organisms from the clothing of personnel to sterile supplies must be prevented.
- 7. Articles not used within 14 days of the date of sterilization must be opened, inspected, rewrapped and resterilized.

#### DISINFECTION AND STERILIZATION

## PURPOSE:

To destroy pathogenic organisms (disinfection); to destroy all organisms (sterilization).

## Cleaning

All articles must be thoroughly cleaned before any disinfection or sterilization is attempted. The washing and scrubbing with soap, water and a mild abrasive mechanically remove many bacteria. All cleaned articles must be rinsed in clear water to remove the cleaning agents.

#### Methods of Disinfection and Sterilization

The selection of a method for disinfecting or sterilizing an article depends upon:

- 1. The composition of the article (metal, glass, rubber, plastic, tissue).
  - 2. The nature of the organism to be destroyed.
  - 3. The time required to destroy the organism.
- 4. The nature of the disinfecting or sterilizing agent.
  - 5. Cost.

## Physical Agents Used in Sterilization

Physical agents used in sterilization are moist or dry heat. Important points to remember when using these agents are the temperature required, the time required, and contact by heat with all parts of the article being sterilized.

## Boiling Water (utensil and instrument sterilizers)

- 1. Used for metalware, glassware, some rubber goods. Do not use for plastics or hard rubber articles.
- 2. The article to be boiled must be completely covered by water. Wrap rubber goods in gauze or old linen to keep them submerged during boiling period.

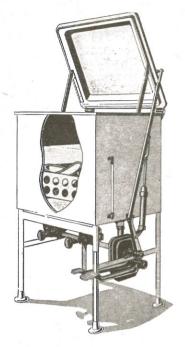


Figure 156.—Utensil Sterilizer.

- 3. Allow enough room in the sterilizer for all articles to be in contact with the boiling water.
- 4. Time: 10 minutes for small articles (syringes, rubber tubing); 20 minutes for large articles (basins, pitchers).

The boiling period is timed from the start of vigorous boiling. When this period is reached, reduce steam sufficiently to maintain boiling point without wasting steam.

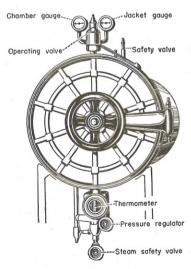


Figure 157.—Diagram of Autoclave.

Steam Under Pressure (autoclave)

- 1. Method of choice for metalware, glassware, rubber tubing, gloves, and dry goods.
- 2. The articles must be wrapped or placed in a container before sterilization.
- 3. Each article must be labeled with date of sterilization.
- 4. Articles to be autoclaved should be as nearly the same size and type as possible.
- 5. Allow enough space in the autoclave for all articles to be in contact with the steam. As each item is placed in the autoclave, imagine it to be filled with water. Place the item so that the water will drain out.
- 6. Use sterilizer controls in each load auto-claved.
  - 7. Operating the autoclave:

Turn on steam valve.

Load autoclave.

Close door tightly when pressure in jacket reaches 17 pounds.

Turn operating valve to "sterilize."

Start timing sterilization period when chamber gage registers 17 pounds pressure and thermometer registers 254° F.

Follow "8" below for sterilization period.

Turn operating valve to "exhaust" when time for sterilization is finished.

Turn operating valve to "vacuum" when chamber gage reads "zero."

Allow to remain on "vacuum" 5 to 10 minutes, according to size of package being autoclaved.

Turn operating valve to "off."

Open door when gage reads "zero."

Allow door to stand open 1 inch for 15 minutes.

Unload autoclave. Date articles.

Check sterilizer controls. (Turn off steam supply if no further autoclaving is to be done.)

8. Time (254° F. at 17 pounds pressure):

Dry goods (large packs), 45 minutes.

Dry goods (average packs), 30 minutes.

Unwrapped instruments or small instrument trays, 10 minutes.

Wrapped instruments or instrument trays, 30 minutes.

Wrapped rubber gloves, 20 minutes.

Flasks of solution two-thirds full: 1,000 cc., 15 minutes; 2,000 cc., 20 minutes.

## Dry Heat (hot air oven)

- 1. Used for ointments, oils, waxes and powders; may also be used for glassware, instruments, needles, dry goods.
- 2. Time—for oils, ointments, waxes, powders: 120 minutes at 320° F.; for glassware, instruments, needles, dry goods: 60 minutes at 320° F.

## Flame (incineration)

- 1. Used for materials which can be burned—food, paper materials, dressings.
  - 2. Time—until completely destroyed.

## Sunlight

- 1. Used for clothing, bedding, and mattresses.
- 2. Time—6 hours or more in direct sunlight—on each side.

# Chemical Agents Used in Disinfection

Chemical disinfection is used only when an article cannot withstand other measures of sterilization. There is no chemical disinfectant available which meets requirements for destroying all organisms on all articles. Essential factors are the strength of solution required, the time required, the nature of the organism to be destroyed, and contact by chemical with all parts of the article being disinfected.

Quaternary ammonium compounds have been found to be effective in high dilutions and more effective in the presence of organic matter than many other disinfectants. However, they are not effective in the presence of soap or against the tubercle bacillus.

Used as a skin disinfectant in 1:1,000 dilutions.

Used as disinfecting agent for sharp and delicate electrical instruments. The quaternary ammonium compound most frequently used is: benzalkonium chloride solution 10 percent, 40 cc.; sodium nitrite solution 50 percent, 40 cc. (antirust agent); purified water, qs, 4,000 cc. Time: 30 minutes for vegetative bacteria.

Liquid iodine-type disinfectant (Iodophor) is a combination of iodine and detergent. It is an effective tuberculocidal agent when used in sufficient strength. The solution changes from a clear amber color to milky cloudy appearance as it loses its effectiveness. This disinfectant rapidly loses its ability to destroy organisms in the presence of organic matter and soap.

For vegetative bacteria: Use in solution in strength of 75 parts per million available iodine (18 cc. to 4,000 cc. water). Flush the article with the solution, then immerse for 10 minutes. Hinged instruments require 20 minutes immersion.

For tuberculocidal effect: Recommended solution strengths range from 300 ppm to 450 ppm, following the same flushing procedure and immersion times as for vegetative bacteria.

For sporicidal effect: Not usually recommended; requires overnight (24 hours) immersion; strengths of solution in range of 600 ppm have been suggested.

For metal objects: Sodium nitrite 0.5 percent should be added to the solution.

Alcohol is valuable for maintaining sterility after an article has been sterilized by other methods. Alcohol is effective against vegetative bacteria and tubercle bacillus. Alcohol cannot be used for instruments that have plastic or cemented parts and it is not effective against spores.

Used in 70 percent solution as a skin disinfectant prior to the administering of injections or infusions; as a disinfectant solution for thermometers; to maintain sterility of syringes and instruments after they have been sterilized by other methods.

Formaldehyde-alcohol solution is the most actively germicidal solution commonly available. It is effective against spores.

Used and recommended for disinfecting transfer forceps (technique forceps) and instruments. The solution frequently used is:

1 0	
Isopropyl alcohol 99 percent	700 cc.
Formaldehyde solution U.S.P. 37 percent_	25 cc.
Sodium nitrite	1.0 Gm.
Sodium bicarbonate	1.0 Gm.
Purified water qs. ad	1,000 cc.
Time: Metal instruments—3 hours,	
Catheters (web/shellac)—18 to 24 hours	

## Maintenance of Sterility

To maintain sterility after an article is sterilized it must be protected from contact with unsterile areas.

1. Articles sterilized by boiling:

Use sterile forceps to remove article from sterilizer.

Immediately place the article in a sterile, covered container or wrap in a double thickness, sterile towel. Use care to avoid dripping water

on the towel; if towel becomes wet, it is no longer sterile and the process must be repeated.

2. Articles sterilized by autoclaving:

Article is prepared and sterilized in the container or wrapper in which it can be stored.

Close the cover of metal containers before removing article from autoclave.

Be sure article is dry before removing from autoclave.

3. Articles disinfected by chemicals:

Follow same procedure as in item 1, Articles sterilized by boiling.

# PREPARATION OF SURGICAL SUPPLIES FOR AUTOCLAVING

## General Rules

- 1. All articles to be sterilized must be clean and in good condition.
- 2. Articles to be autoclaved must be wrapped in heavy paper, double muslin covers, or placed in metal or glass containers.
  - 3. Packages and containers must be labeled.
- 4. Packages and containers must be dated after autoclaving.

## Linen (masks, gowns, sheets, towels)

- 1. Inspect all linen for holes, tears, weak spots.
- 2. Roll masks singly and pack loosely in metal containers or paper bags.
- 3. Fold gowns lengthwise, wrong side out, roll from hem to neckband. Wrap singly in paper or double muslin covers.
- 4. Fan fold sheets and towels so that edges are on the outside. Wrap singly in paper or double muslin covers.
  - 5. Time—254° F. at 17 pounds pressure: Large packages or containers—45 minutes. Average packages or containers—30 minutes.

## Dressings

- 1. Compresses, applicators, cotton balls—pack loosely in metal containers or wrap in paper or double muslin covers.
- 2. Pads—fold pad in half, smooth side inside, and wrap singly in paper or double muslin covers.

## Glassware (syringes, tubing, beakers, tips, jars)

- 1. Inspect all glassware for cracks or chips.
- 2. Wash with soap or detergent and water; rinse well.

- 3. Clean inner surfaces with applicators.
- 4. Syringes:

Match numbers on plunger and barrel.

Wrap plunger and barrel in gauze, separate surfaces by layer of gauze. Wrap in paper or double muslin cover.

5. Tubing, beakers, tips:

Wrap in gauze, then in paper or double muslin covers. When part of a sterile tray, always wrap in gauze.

## 6. Jars:

No wrapping necessary; prepare in same manner as Metal Containers, see below.

7. Time: Same as for Linens.

# Metal Containers (cans, jars, trays)

- 1. Remove cover from container.
- 2. Place and tie a gauze cover over container.
- 3. Replace metal cover loosely on top of container.
- 4. Turn container on side in the autoclave to allow penetration by steam.
  - 5. Time: Same as for Linens.

#### Instruments

- 1. Wash instruments with warm soapy water; brush the hinged or serrated parts; rinse and dry.
  - 2. Instrument trays:

Place a single thickness of linen in bottom of trays. Open all hinged instruments. Fill tray to within one-half inch of top by alternating a layer of instruments with a layer of linen.

3. Time: 30 minutes at 254° F. at 17 pounds pressure.

## Needles (for injection, suture)

- 1. Inspect all needles for hooks and burrs.
- 2. Needles for injection:

Rinse with cold water. Clean hub of needle with cotton applicator. Pass a stilet through bore of needle. Rinse needle with alcohol, ether. Dry with needle drier.

Insert a small piece of cotton in bottom of a glass tube; place the needle in the tube and plug the tube with cotton.

3. Suture needles:

Wash and dry needles. Scour with non-abrasive scouring powder when necessary. Always clean toward point of needle.

Arrange needles according to type on a piece

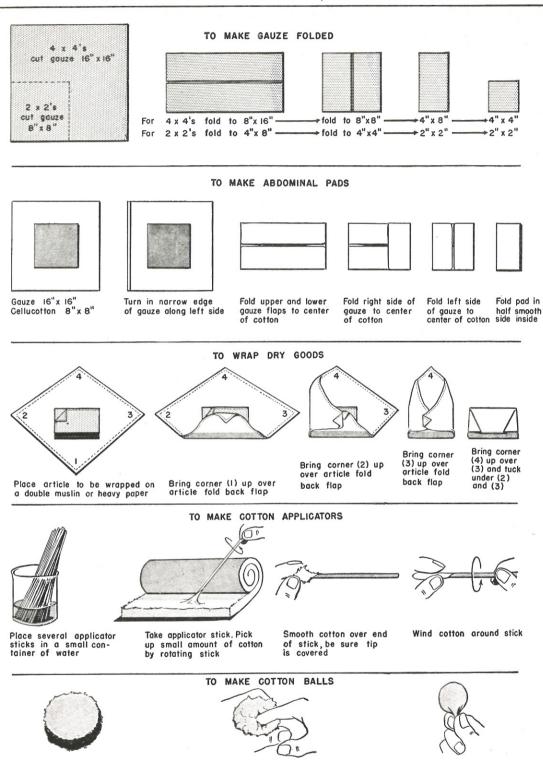


Figure 158.—Preparation of Surgical Supplies.

Place piece of cotton in circle formed by index finger and thumb press in center of cotton

Moisten tips of index and middle finger, twist top of cotton together between

fingers

Take circular piece of cotton

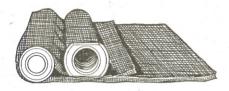




Figure 159.—Wrapping Syringes.

of gauze (straight, curved, round or cutting edge, tapered point).

4. Time: Same as for Instruments.

# Rubber Goods (gloves, tubing, drains)

#### 1. Gloves:

Inflate gloves. Test for holes. Lightly powder gloves inside and out. Sort into pairs; turn back a 3-inch cuff. Place gloves inside muslin or paper glove holder. Add packet of powder. Wrap package in a paper or double muslin cover. Write glove size on the outside wrapper.

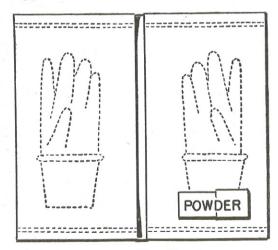


Figure 160.—Glove Wrapping.

# 2. Tubing:

Remove all clamps. Wash tubing with warm soapy water; rinse. Place flat in a container or wrapper, or coil loosely without kinks in treatment trays.

## 3. Drains:

Rubber dam: Wash thoroughly in warm soapy water; rinse. Cut into lengths and widths

as needed. Place flat in a metal container or suspend in a glass tube.

Cigarette drains: Wash thoroughly with warm soapy water; rinse. Insert gauze bandage through center of tubing. Place flat in a metal container or suspend in a glass tube.

Catheters: Wash thoroughly with warm soapy water; rinse. Place on covered wooden splints and wrap in double muslin or paper covers or place flat in metal container.

4. Time: 15 minutes at 254° F. at 17 pounds pressure.

Suture Materials (catgut, silk, cotton, linen, wire, horsehair, clips)

1. Silk, cotton, horsehair, nylon, linen:

Wrap material loosely about a piece of cardboard or cut into strands. Place in a test tube and wrap in a double muslin cover; place in treatment or instrument tray.

- 2. Clips, treat same as above.
- 3. Time: Same as for Instruments.
- 4. Suture material in hermetically sealed tubes:
  Boilable—autoclave with treatment or instrument trays.

Nonboilable—wash tube with soap and water; rinse.

Place in a covered container of formaldehydealcohol solution for 18 hours. Store in a covered container of same solution. (Bethesda NNMC.)

## SELECTED STERILE TRAYS

These trays are equipped and stocked by the Central Supply Room (CSR) or the Central Dressing Room (CDR) in most Naval hospitals.

# Aspirating Tray (fig. 161)

One 3 cc. local set.

One 30-cc. syringe with metal adaptors.

Two culture tubes.

One No. 13 gage 2-inch needle.

One No. 15 gage 2-inch needle.

One No. 16 gage 1-inch needle.

One No. 16 gage 2-inch needle.

One No. 17 gage 3½-inch needle.

One No. 18 gage 2-inch needle.

One No. 19 gage 2-inch needle.

One No. 20 gage 3-inch needle.

One No. 20 gage 2-inch needle.

Six 4 x 4's.

Two drape sheets.

One towel.

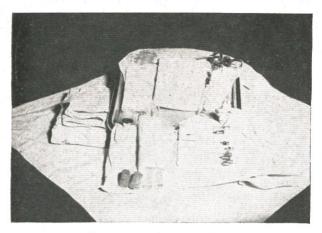


Figure 161.—Aspirating Tray.

# Dressing Tray (fig. 162)

One surgical scissors.

One hemostat.

One thumb forceps.

Two applicators.

Four 4 x 4's.

One towel.

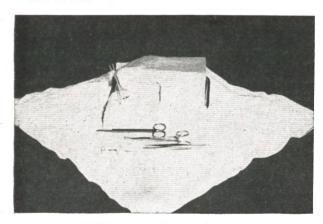


Figure 162.—Dressing Tray.

# Biopsy Tray (fig. 163)

One 10 cc. Luer Lok syringe.

Two 22 gage 3-inch local needles.

Two 26 gage hypodermic needles.

One No. 3 knife handle.

One No. 11 blade.

Two tubes plain 0 catgut.

Two liver biopsy needles.

One needle holder.

Three lengths 3-inch roller gauze.

One beaker.

Six 4 x 4's.

Six swabs.

Two field sheets.

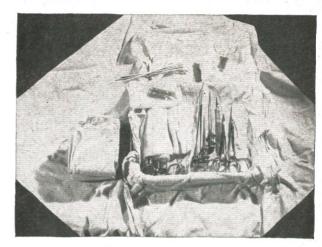


Figure 163.—Biopsy Tray.

# Catheterization Tray (fig. 164)

One curved basin.

Two beakers.

Two catheters No. 14, No. 16.

Six cotton sponges.

One specimen bottle.

One sheet.

Two 4 x 4's.

One tube of water soluble lubricant. (Not shown.)

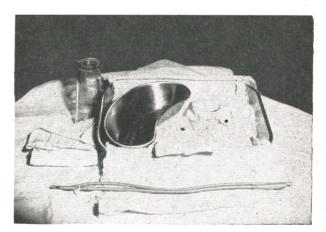


Figure 164.—Catheterization Tray.

# Genitourinary (GU) Set (fig. 165)

One curved basin.

One Asepto syringe.

One medicine glass.

Two 4 x 4's.

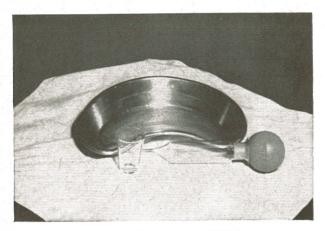


Figure 165.—Genitourinary (GU) Set.



One knife handle No. 3.

One needle holder.

Two mosquito hemostats.

Two straight hemostats.

Two curved hemostats.

Two Allis clamps.

One tissue forceps.

One rat tooth forceps.

One suture scissors.

One 3 cc. syringe with local set.

Three knife blades, Nos. 10, 11, 15.

Two towel clips.

One set suture needles.

Two black silk, No. 00, No. 000.

Two field sheets.

One drape sheet.

Four 4 x 4's.



Figure 167.—Local Set.

# Local Set (fig. 167)

One medicine glass.

One 3 cc. Luer Lok syringe.

One No. 22 gage  $1\frac{1}{2}$ -inch needle.

One No. 23 gage ¾-inch needle.

# Lumbar Puncture Tray (fig. 168)

One 10-cc. syringe.

One 20-cc. syringe.

One 2-cc. local set.

One No. 18 gage spinal needle.

One No. 20 gage spinal needle.

Three specimen tubes with corks.

One drape sheet and towel.

Two applicators.

Four 4 x 4's.

One manometer. (Not shown.)

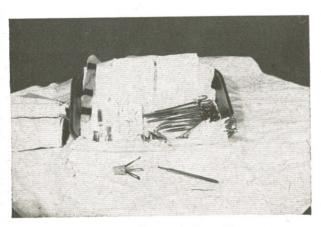


Figure 166.—Emergency Suture Tray.

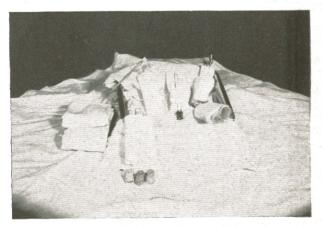


Figure 168.—Lumbar Puncture Tray.

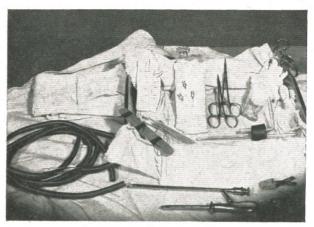


Figure 169.—Paracentesis Tray.

# Paracentesis Tray (fig. 169)

One 2-cc. syringe.

One No. 22 gage 1½-inch needle.

One No. 22 gage 2-inch needle.

One No. 23 gage ¾-inch needle.

One 30-cc. syringe.

One medicine glass.

One piece rubber tubing, 5 feet in length with glass connection.

One cannula, straight.

One two-hole rubber stopper with 4-inch straight glass rod.

One knife handle No. 2.

Two blades, No. 10, No. 11.

One set assorted suture needles.

One drape sheet.

Two field sheets.

Sixteen 4 x 4's.

One long piece rubber tubing.

One black silk, No. 0, No. 00, No. 000.

Two mosquito forceps.

One 3-way stopcock.

One right-angle glass tube.

## Phlebotomy Tray (fig. 170)

One plain forceps.

One rat tooth forceps.

Two mosquito hemostats, straight.

Two mosquito hemostats, curved.

One knife handle No. 3.

One straight scissors.

One needle holder.

One set knife blades, No. 10, No. 11.

One No. 18 gage needle.

One No. 20 gage needle.

One No. 15 gage needle.

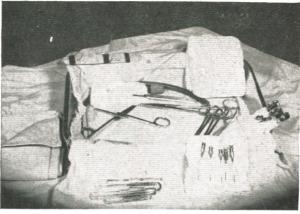


Figure 170.—Phlebotomy Tray.

One No. 18 and 1 No. 20 Titus needle.

One medicine glass.

One 2-cc. syringe.

One set suture needles.

One set local needles.

One adaptor with rubber tubing.

One drape sheet.

One black silk No. 0, No. 00, No. 000.

Five 4 x 4's.

One tube No. 0 plain suture.

One tube 3-0; 4-0; 5-0 dermal suture.

# Sternal Marrow Puncture Set (fig. 171)

One 2-cc. local set.

Two 2-cc. syringes.

One 10-cc. syringe.

Two curved mosquito hemostats.

One No. 3 knife handle.

One No. 11 blade.

Two sternal puncture needles.

Four 4 x 4's.

Two applicators.

Two right-angle tubes.

One field sheet.

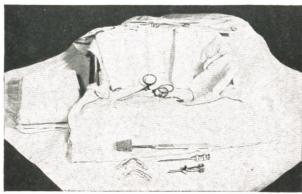


Figure 171.—Sternal Marrow Puncture Set.

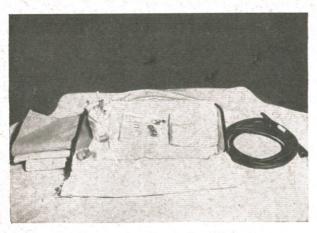


Figure 172.—Pneumothorax Tray.

# Pneumothorax Tray (fig. 172)

Two towels.

Two No. 17 gage, 3-inch needles.

Three No. 18 gage, 2-inch needles.

Three No. 21 gage, 2-inch needles.

One 10-cc. syringe.

One 2-cc. syringe.

One No. 26 gage needle.

One black rubber tubing with needle adaptor and glass connection.

One medicine glass.

Two néedle adaptors.

One 30-cc. syringe.

Aspirating needles.

Local needles.

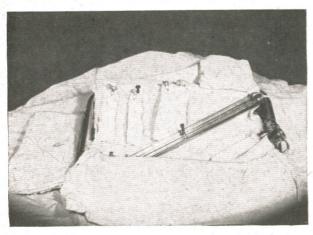


Figure 173.—Venous Pressure Tray.

## Venous Pressure Tray (fig. 173)

One spinal manometer and stopcock. (Sterilize separately.)

One 20-cc. syringe with No. 20 gage needles. One T.B. syringe with No. 23 gage needles. One 10-cc. Luer Lok syringe with finger control.

Four 4 x 4's.

# Thoracentesis Tray (fig. 174)

One medicine glass.

One 2-cc. syringe with No. 23, No. 26 gage needles.

One 30-cc. syringe with adaptor.

One Pilling guard.

One rubber tubing with needle adaptor.

Two No. 20 gage 2-inch needles.

One No. 18 gage 3-inch needle.

One No. 21 gage needle.

Two drape sheets.

One drape sheet.

One curved basin. (Not shown.)

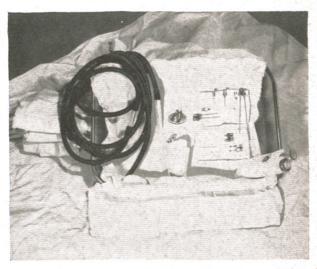


Figure 174.—Thoracentesis Tray.

## Wet Dressing Tray (fig. 175)

One Asepto syringe.

One basin.

One thumb forceps.

One curved basin. (Not shown.)

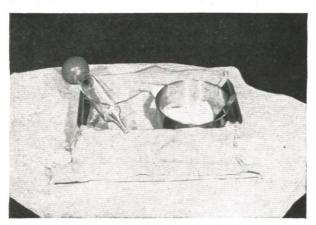


Figure 175.—Wet Dressing Tray.

## Tracheotomy Set (fig. 176)

One Jackson aspirating tube.

Two small, medium, large silver tracheotomy tubes with tapes.

Two tracheotomy retractors.

Six curved hemostats.

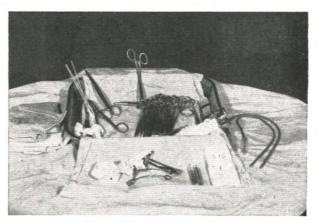


Figure 176.—Tracheotomy Set.

One tracheal dilator.

One tracheal blunt knife.

One dissecting scissors, straight.

One thymus retractor.

One tracheal tenaculum.

One needle holder.

Four towel clips.

# PREPARATION OF THE OPERATING ROOM

Review—Local Station Instructions

The procedures outlined in these pages are those necessary to prepare the patient, personnel, and equipment for general surgery. The additional instruments and equipment required by the surgeon for a particular operation should be ascertained by the operating room corpsmen before preparations are begun.

## THE OPERATING ROOM

#### Cleaning

Daily routine cleaning should consist of mopping the floors and damp-dusting all furniture. Each week the walls, floors, and furniture should be vigorously scrubbed with soap and water.

## Lighting

Overhead lights used to provide concentrated shadowless light during the operation should be checked each day.

#### Ventilation

The temperature of the operating room should be constant, preferably 70° to 74° F. with humidity of 48 to 55 percent.

## Furniture

Furniture in the operating room should be clean and maintained in good working order. The basic pieces of furniture are usually: Operating table, gown and drape table, double ring stand with tray secured over one ring, single ring stand, two instrument tables (Mayo stand), anesthetist's table and stool.

CAUTION: All furniture in the operating room should be grounded with clean drag chains.

# PREPARATION FOR GENERAL SURGERY EQUIPMENT:

General laparotomy pack containing—

Two Mayo stand covers.

Four packs 4 x 4 gauze (12 per pack).

Two upper sheets.

One single fold sheet.

One laparotomy sheet.

Fifteen towels.

Five 10 x 10 sponges.

Five 2 x 10 sponges.

Three gowns.

One special bag containing one ABD pad, one roll hernia tape, eight safety pins, three cotton swabs.

General instrument tray containing-

Two No. 3 knife handles.

Two plain thumb forceps.

Two rat tooth thumb forceps.

One Russian dressing forceps.

Two needle holders.

One suture scissors.

One curved Mayo scissors.

One straight Mayo scissors.

One Metzenbaum scissors.

One probe.

One groove director.

Two Michel clip holders and clips.

One ribbon retractor.

One pair Parker retractors.

One pair Richardson retractors.

One pair medium Deaver retractors.

Twelve small curved Kelly hemostats.

Twelve small straight Kelly hemostats.

Six Allis clamps.

Six Kocher clamps.

Three Babcock intestinal clamps (two small, one large).

Twelve towel clips.

Twelve sponge forceps.

One needle book.

One pair Army retractors.

The laparotomy pack and instrument tray are wrapped, autoclaved and kept in readiness for immediate use at all times.

# Preparation of Personnel

All personnel assigned to the operating room change to wash suits or dresses upon reporting for duty. Surgeons, assistant surgeons, anesthetists and observers also change to wash suits upon entering the operating room suite.

In preparing for an operation, all personnel involved first don clean caps and masks—the cap completely covering the hair and the mask covering the nose and mouth. They then proceed to the scrub-up room and follow one of the two hand washing techniques described below, or one prescribed by local instructions. After hand washing, the gown and gloves are donned as illustrated in figure 177.

## Hand Washing Techniques

1. Using running water and detergent:

Preliminary wash: 1 minute—wash hands and arms to 2 inches above elbows. Clean nails with nail stick. Rinse by holding hands up, allow water to drain off elbows.

Final wash: Systematically scrub hands and arms with a sterile brush and detergent. Begin at outer surface of the thumb; proceed to the inner, then to each finger; scrub the palm of the hand, then the back of the hand. Repeat for the other hand. Then proceed toward the elbow, scrubbing in a circular motion.

Scrub 4 minutes, rinse by holding hands up; allow water to drain off elbows. Dry hands and arms with a sterile towel. Hold hands up!

2. Using running water and green soap:

Wash hands and clean finger nails with a nail stick.

Scrub hands and arms systematically with a sterile brush and tincture of green soap for 5 minutes as described above.

Discard first brush—with a new one, scrub for 5 minutes more.

Rinse and reapply soap frequently during scrub period.

After 10 minutes (total) rub alcohol into arms and hands.

Dry hands and arms with sterile towel. Hold hands up!

#### Duties of Personnel

## Circulating Corpsman

## Before the operation:

- 1. Damp-dust all furniture in the operating and scrub rooms.
  - 2. Set up scrub room.
- 3. Set up operating room; bring all necessary supplies, set furniture in proper places, adjust lights, check working order of all electrical units.
- Assist scrub corpsman in donning gown and gloves. Open laparotomy pack for scrub corpsman.
  - 5. Preparation of the patient:

Place patient on table in the proper position.

- (a) For general anesthesia, place restraint over patient's knees, secure his arms at the sides.
- (b) Spinal anesthesia. Place patient on his side, with knees flexed and head drawn

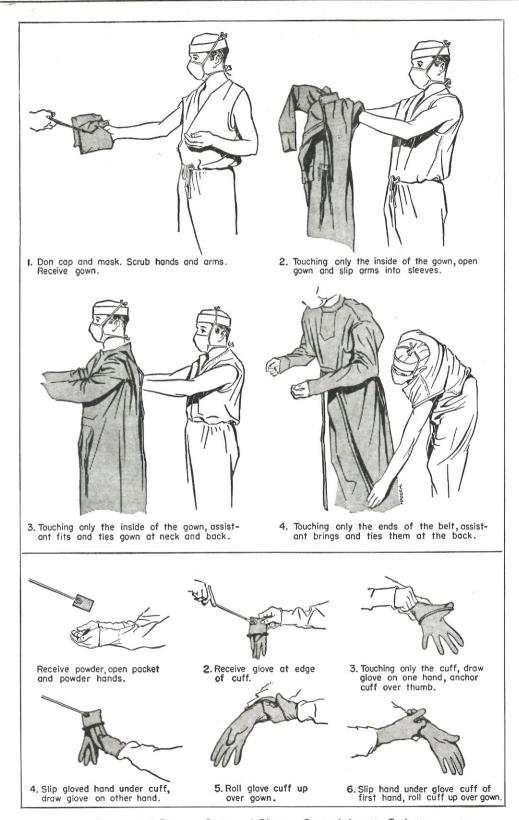


Figure 177.—Donning Gown and Gloves. Surgical Aseptic Technique.



Figure 178.—BACK TABLE. Left to right. Front row: Gloves, powder for gloves, 3 sponge sticks, 4 skin towel clips, 4 sponge sticks with sponges for preparing field of operation. Back row: Three gowns, 8 towels, 3 sheets (1 laparatomy), sutures, skin preparation tray. This table is covered and pushed out of the way after the personnel are gowned and patient is prepared and draped.



Figure 179.—RING STAND. Left to right. Front row: Five 10 x 10 sponges, needle book, 2 needle holders, 1 Russian dressing forceps, 2 Michel clip holders and clips, 1 groove director, 1 probe, 1 ribbon retractor.



Figure 180.—THE OPERATING ROOM. Front row: Circulating nurse, assistant, anesthetist. Back row: Scrub corpsman, surgeon.



Figure 181.—SPINAL ANESTHESIA TRAY. Left to right. Front row: Twenty cc. syringe, 2 cc. syringe, hemostat. Back row: Medicine glass with sterile saline, procaine, introducer, 2 spinal needles, 2 21 gage needles, 2 26 gage needles, 4 x 4 gauze.

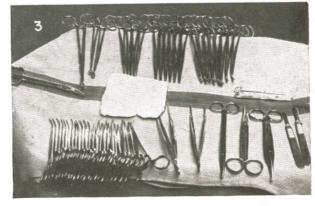


Figure 182.—MAYO STAND. Left to right. Front row: Twelve small curved Kelly hemostats, 12 small straight Kellys, 2 rat-tooth forceps, 2 plain forceps, Metzenbaum scissors, straight Mayo scissors, curved Mayo scissors, 2 scalpels. Center row: Suture scissors, package 4 x 4 gauze, 2 tubes ligature ties. Back row: One large Babcock, 2 small Babcock intestinal forceps, 4 Allis forceps, 6 Kocher and 8 large Kelly hemostats.

Figures 178-182.—An appendectomy in progress. Note the placement of equipment and the positions of the personnel.

on his chest until after anesthesia has been given. Remain with the patient and anesthetist during the administration of the anesthetic.

6. Remove all sponges used for the anesthesia and preparation of the skin from the room before the operation begins.

### During the operation:

- 1. Remain in the room at all times.
- 2. Anticipate the needs of the "scrubbed" corpsman and surgeon.
- 3. Keep sponge count. Before the peritoneum is closed, check with scrub corpsman. The number of used sponges, the number the scrub corpsman still has must equal the total number of sponges placed in the operating room. If the count is not correct, the surgeon must be told and search instituted for the missing sponges.

#### After the operation:

- 1. Assist in applying the outer dressing.
- 2. Bring stretcher into room and assist in lifting the patient from the table.
- 3. Cover the patient and send him with a corpsman to his ward.

### Scrub Corpsman

#### Preparation:

- 1. Cap and mask are clean rather than sterile and are donned before scrubbing hands or putting on sterile gown and gloves.
- 2. Cap must completely cover the hair and mask must cover the nose and mouth.

### Duties:

- 1. Scrub, don gown and gloves.
- 2. Drape each table and stand with cover, field cloth, and towels.

- 3. Place basins in ring stands.
- 4. Arrange instrument table and ring stand.
- 5. Prepare spinal tray if spinal anesthesia is to be given.
- 6. Prepare sponge sticks for painting the operative site.
  - 7. Assist with draping the patient:

Four towels placed to expose operative site, secured by clips.

Sheet over lower part of patient.

Laparotomy sheet over the entire patient with the opening directly over the operative site.

Two towels secured by towel clips directly over site so that only operative area is exposed.

- 8. Move the instrument table up into place.
- 9. Prepare sutures.
- 10. Anticipate the surgeon's and his assistant's needs.
- 11. Keep sponge count. Check with circulating corpsman before the closing of the peritoneum.

### References and Suggested Additional Reading— Unit VI

Alexander, E. L.: The Care of the Patient in Surgery Including Techniques. 3d ed. St. Louis, C. V. Mosby Co., 1958.

Harmer, B. and Henderson, V.: Textbook of the Principles and Practice of Nursing. 5th ed. New York, Macmillan Co., 1955. Chapter 8.

Perkins, J. J.: Principles and Methods of Sterilization. Springfield, Ill., Charles C. Thomas, 1956.

Reddish, G. F. (Ed.): Antiseptics, Disinfectants, Fungicides and Sterilization. 2d ed. Philadelphia, Lea and Febiger, 1957.

Walter, C. W.: Aseptic Treatment of Wounds. New York, Macmillan Co., 1948.

### APPENDIX

### ABBREVIATIONS AND SYMBOLS

Abbreviations	Meaning	Abbreviations	Meaning
Relating to personnel		Relating to physical ex	xamination
	commanding officer.	BP	blood pressure.
OOD	officer of the day.	L.L.L.	
WMO	ward medical officer.	L.L.Q	left lower quadrant.
SpW		L.U.L	left upper lobe.
		L.U.Q	left upper quadrant.
Relating to wards and		0S	mouth.
	communicable disease.	O.S	left eye.
CDR or CSR	central dressing or supply	O.D	
	room.		physical examination.
	eye, ear, nose and throat.	R.L.L.	right lower lobe.
GU	genitourinary.		right lower quadrant.
Lab	laboratory.		right middle lobe.
	mechanotherapy.	R.U.L	
Med			right upper quadrant.
	neuropsychiatric.	T.P.R.	temperature, pulse, respira-
	obstetrical or maternity.		tion.
OR		D. I	
OT	occupational therapy.	Relating to tests and e	
	pediatric or children.		basal metabolism rate.
Pharm			bromsulfalein test.
PT	physical therapy.		complete blood count.
	sick officers quarters.		electroencephalogram.
Surg TB	tuboraulogis		electrocardiogram.
Wd		ESK or Sea rate	erythrocyte sedimentation rate.
VV Q	- ward.	CP garries	gallbladder series of X-rays.
Relating to census		GI series	
CLR	census last report.	G1 series	X-rays.
A	admitted to hospital.	Hgb	
	admitted from other ward.		intravenous pyelogram.
	transferred to other ward.		lumbar puncture.
	discharged from hospital.		nonprotein nitrogen.
	discharged by death.		phenolsulphonphthalein test.
Occ		Rbc	
Vac		sp. gr	
Cap		S & A	sugar and acetone.
Dep			volume packed cells.
VAB	Veterans Administration beneficiary.		white blood cell and differential count.
L	_ leave or liberty.		
	_ absent over leave.	Relating to medicine	
	_ prisoner at large.		ampoule or ampule.
CL	_ critical list.		<ul> <li>hypodermic or subcutaneous.</li> </ul>
SL	serious list.	I.M	_ intramuscular.

Abbreviations Meaning	Abbreviations Meaning
Relating to Medecines—Continued	Relating to surgical supplies—Continued
I.V intravenous.	F sheet field sheet used to establish
p.o by mouth.	sterile field.
p.r by rectum.	4 x 4 gauze dressing folded to 4 x
Relating to weights and measures	inches. 2 x 2 gauze dressing folded to 2 x 2
$\bar{a}\bar{a}_{}$ of each.	inches.
ad. lib as much as desired.	
cc cubic centimeter.	Relating to surgical operation
(3) dram.	O.P day of operation.
Gm gram.	D.O.S. day of surgery
gr grain.	P.O.D post operative day.
gtt drop (drops).	Pre-Op before operation.
kg kilogram or 1,000 grams.	Post-Op after operation.
L liter.	Miscellaneous
lb pound.	$c_{}$ with.
m. or min minim.	C centigrade.
mg milligram, 1000th of a gram. mil. or ml milliliter, 1000th of a liter.	DU diagnosis undetermined.
(5), oz ounce.	$\operatorname{et}_{}$ and.
pt pint.	etc and so forth.
q.s sufficient quantity.	Ffahrenheit.
$\operatorname{qt}_{}$ quart.	Fr French, denotes size of cathe
SS one-half.	$\mathbf{s}_{}$ ter or tube.
t. or tsp teaspoon.	S without
T. or tbsp tablespoon.	MEDICAL TERMINOLOGY
D.L.C. at all and a second sec	MEDICAL TERMINOLOGY PURPOSE:
Relating to time	To help the corpsman gain understanding o
a.c before meals.	what he reads in his patients' records and in
b.i.d twice a day.	medical literature.
h.s hour of sleep or at bedtime. q.d every day.	
q.m every morning.	Suggested Method of Study
q.n every night.	1. Select a new word each day.
p.c after meals.	2. Look at it; break it down into its parts.
p.r.n when necessary.	3. Write down what you think it means.
q1 (2, 3, 4) h every 1 (2, 3, 4) hours.	4. Check your answer with the definition in
q.i.d. or 4 i.d four times a day.	a medical dictionary.
S.O.S once if necessary.	Example:
stat at once.	Myocarditis
t.i.d three times a day.	myo card itis
D.L.,	myo—muscle
Relating to solutions	card—heart
B.A. boric acid solution.	itis—inflammation of
N.S.S. or N.S. normal saline solution.	Myocarditis: Inflammation of the muscles of
S.S.E soap suds enema.	the heart.  Prefixes
Relating to surgical supplies	_
	Pertaining to the Body
Abd abdominal pad. D.S.D dry sterile dressing.	brach arm.
D.S.D. I ury sterne dressing.	capit head.
4–172	

cardi heart. cholecyst gallbladder. cyst bladder. derma skin. entero intestines. glosso tongue. gastro stomach. hemo blood. hepat liver haparo abdomen. myo muscle. nephvo kidney. neuro nerve. ophthalmo eye. otto ear osteo bone. oral mouth. pharyn throat. phileb vein. ppeumo lung. procto rectum. rhino nose. thoracic chest.  Pertoining to Conditions aa or an lacking, absence of. auto self. ante before. anti against, opposed to. dys difficult, painful. endo within. hemi half. hydro water. hyper above, increase, in excess. hypo below, under. mal faulty, poor. neo new. oligi scanty, few. ortho straight. peri around. poly loo many, too much. poly pyps.  Pertoining to Conditions of the Body -lagia paincele. tumor, hernia.  -elee. tumor, hernia.  -elee. tumor, hernia.  -elysis. as bow injection of a large amount of fluidesthesiaitisitisitiaitisitiaitisitiaitisitiaitisitiaitisitiaitisitiaitisitiaitisitiaitisitiaitisitiaitisitiaitiaitisitiaitisitiaitiaitiaitiaitiaitiaitiaitiaitiaitiaitiaitiaitiaitiaitiaitiaitiaithermy diseasephob is fallingrrheaflow, disease.	Pertaining to the Body—Continued	Pertaining to conditions of the body—Continued
cholecyst. gallbladder. cyst. bladder. cyst. bladder. derma skin. entero intestines. glosso tongue. gastro stomach. hemo blood. hepat. liver. laparo abdomen. myo muscle. nephvo kidney. neuro nerve. ophthalmo eye. oto ear. osteo bone. oral mouth. pharyn throat. phleb vein. pneumo lung. procto rectum. rhino nose. thoracic chest.  Pertoining to Conditions a or an lacking, absence of. auto self. ante before. auti against. contra against, opposed to. dys difficult, painful. endo within. hemi half. hydro water. hyper above, increase, in excess. hypo below, under. mal faulty, poor. neo new. oligi seanty, few. ortho straight. port or many, too much. pyo pus. pyro heat, temperature.  Suffixes  Pertoining to Conditions of the Body elgia. pain.  amount of fluid. esthesia. sensation. inflammation. litis. inflammation. lith stone, calculus. mana insanity. oma enorbid condition, tumor. opia vision. pathy disease. phobia fear, or dread. plegia paralysis. pprosis falling. r-trea flow, discharge. scopy visual examination, looking intotherapy treatmenttherapy treatmentthermy heattrophic, trophy growth, nutritionurie, uria urinethermy heattrophic, trophy growth, nutritionurie, uria urinethermy heatthermy heatthermy heatthermy heatthermy heatthermy heatthermy heatthermy heatthermy repaironthere used to measure resoureectomy repair ofmanometer used to examine by looking into, or by hearing.  Examples for Practice -manometer used to measure resoureenter used to measure pressureenter used to measure pressureenter used to measure pressureenter used to measurescope used	cardi heart.	-clysis a slow injection of a large
eyst bladder derma skin. entero intestines. glosso tongue. gastro stomach. hemo blood. hepat liver. laparo abdomen. myo muscle. nephvo kidney. neuro nerve. ophthalmo eye. oto ear. osteo bone. oral mouth. pharyn throat. pheb vein. pneumo lung. procto rectum. rhino nose. thoracic chest.  Pertaining to Conditions a or an lacking, absence of. auto self. aute before. anti against. contra against, opposed to. dys difficult, painful. endo within. hemi half. hydro water. hyper above, increase, in excess. hypo below, under. mal faulty, poor. neo new. offici scanty, few. oriho straight. poor pus. pyro heat, temperature.  Suffixes  Pertaining to Conditions  - semsation dits. inflammation disease phobia fear, or dread plegia paralysis prea breathing phobis fealing prea breathing phobis falling rrhea flow, disease phoba fear, or dread plegia paralysis pread, breathing phosis falling rrhea flow, disease phoba fear, or dread plegia paralysis pread breathing plosis falling rrhea flow, disease phoba fear, or dread plegia paralysis pread breathing plosis falling rrhea flow, disease phoba fear, or dread plegia paralysis pread breathing plosis falling provision disease phobia fear, or dread plegia paralysis pread breathing plosis falling rrhea flow, disease phobia fear, or dread plegia paralysis paralysis pertain paralysis pread breathing plosis falling rrhea flow, disease rooty a fling	cholecyst gallbladder.	
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-celetumor, hernia. 16. Hydrotherapy.		
	-celetumor, herma.	16. Hydrotherapy.

Concerning	Observation	Term to use
Abdomen	<ol> <li>Hard, boardlike.</li> <li>Soft, flabby.</li> <li>Hurts when touched.</li> <li>Appears swollen, rounded.</li> <li>Filled with gas.</li> </ol>	<ol> <li>Hard, rigid.</li> <li>Relaxed, flaccid, soft.</li> <li>Sensitive to touch.</li> <li>Protuberant.</li> <li>Distended, tympanites.</li> </ol>
Areas		1. Epigastric. 2. Right lumbar. 3. Umbilical. 4. Left lumbar. 5. Right iliac. 6. Hypogastric. 7. Left iliac.
Amounts	of drainage. of urine. of defecation. of emesis:	Profuse, copious, free. Polyuria, measured in cc. Copious. Measured amount in cc.
	2. Medium amount:     of drainage.     of urine.     of defecation.     of emesis. 3. Small amount:     of drainage.	Moderate, usual. Measured amount in cc. Moderate. Measured amount in cc.  Small amount, scanty, slight, very little.
	of urine. of defecation. of emesis.	Scanty, measured in cc. Small amount. Measured amount in cc.
Appetite	<ol> <li>Very fussy about food, refuses to eat many foods.</li> <li>Eats all foods served.</li> <li>Eats very little.</li> <li>Loss of appetite.</li> <li>Craving for certain foods.</li> <li>Refuses to eat.</li> </ol>	<ol> <li>Has definite likes and dislikes about food</li> <li>Appetite good.</li> <li>Appetite poor.</li> <li>Anorexia.</li> <li>List foods.</li> <li>Refused food (state reason).</li> </ol>
Arm	<ol> <li>Shoulder to elbow.</li> <li>Elbow to wrist.</li> </ol>	1. Upper arm (right or left). 2. Lower arm (right or left).
Back (areas)	<ol> <li>Upper back.</li> <li>Small of back.</li> <li>End of spine.</li> <li>Gluteal region.</li> </ol>	<ol> <li>Interscapular shoulder region.</li> <li>Lumbar region.</li> <li>Sacral region.</li> <li>Buttocks.</li> </ol>
Baths	<ol> <li>Given when patient is admitted.</li> <li>All inclusive bath.</li> <li>Including: face, arms, back, axilla, and genitals.</li> </ol>	<ol> <li>Admission bath.</li> <li>Complete bath.</li> <li>Partial bath.</li> </ol>
Belch	4. Special baths (treatments). Belching.	4. Name of bath (alcohol sponge, Sitz, etc.) Eructation.
Bleeding	<ol> <li>Spurting of blood.</li> <li>Very little.</li> <li>Nosebleed.</li> <li>Blood in vomitus.</li> <li>Blood in urine.</li> <li>Spitting of blood.</li> <li>When bleeding is stopped.</li> <li>Color.</li> </ol>	1. In spurts. 2. Oozing. 3. Epistaxis. 4. Hematemesis. 5. Hematuria. 6. Hemoptysis. 7. Hemorrhage controlled. 8. Bright red, dark red, frothy.
Blister Blood pressure B.M.R	Blister. Blood pressure 120/74. Basal metabolism rate.	Vesicle. B.P. 120/74. B.M.R.
Breath	<ol> <li>Unpleasant.</li> <li>Foul odor.</li> <li>With sweet fruitlike odor.</li> </ol>	1. Halitosis. 2. Foul. 3. Fruity.

Concerning	Observation	Term to use
Breathing	<ol> <li>Breathing.</li> <li>Act of inhaling.</li> <li>Act of exhaling.</li> <li>Difficult breathing.</li> <li>Short periods when breathing has ceased.</li> <li>Inability to breathe lying down.</li> <li>Normal breathing.</li> <li>Rapid breathing.</li> <li>Increasing dyspnea with periods of apnea.</li> <li>Snorting breathing.</li> <li>Large volume of air inspired or expired.</li> <li>Small volume of air inspired or expired.</li> <li>Abnormal variation in rhythm.</li> </ol>	<ol> <li>Respiration.</li> <li>Inspiration.</li> <li>Expiration.</li> <li>Dyspnea.</li> <li>Apnea.</li> <li>Orthopnea.</li> <li>Eupnea.</li> <li>Hyperpnea.</li> <li>Cheyne-Stokes respiration.</li> <li>Stertorous respiration.</li> <li>Deep breathing.</li> <li>Shallow breathing.</li> <li>Irregular respiration.</li> </ol>
Care	<ol> <li>Oral hygiene, bedpan, face and hands sponged.</li> <li>Oral hygiene, bedpan, bath, care of hair and nails, alcohol back rub.</li> <li>Oral hygiene, bedpan, face and hands sponged, alcohol back rub.</li> <li>Special attention or treatment.</li> </ol>	<ol> <li>Early a.m. care.</li> <li>Complete care.</li> <li>P.m. care.</li> <li>Special care to back, mouth, etc.</li> </ol>
Chill	<ol> <li>Blanket applied to help warm the patient.</li> <li>Type as to severity.</li> <li>Duration.</li> </ol>	<ol> <li>External heat applied.</li> <li>Severe, moderate, slight.</li> <li>Lasting number of minutes.</li> </ol>
Coma	<ol> <li>Partly in coma.</li> <li>Deep in coma.</li> </ol>	1. Partially comatose. 2. Profound coma.
Convulsion	<ol> <li>Continuous shaking.</li> <li>Shaking with intervals of rest.</li> <li>Begin without warning.</li> </ol>	<ol> <li>Duration and description.</li> <li>Duration and description.</li> <li>Sudden onset.</li> </ol>
Cough	<ol> <li>Coughs at all times.</li> <li>Coughing over a long period of time.</li> <li>Coughs up material.</li> <li>Short, hard cough.</li> </ol>	1. Continuous cough. 2. Persistent cough. 3. Productive cough, describe. 4. Hacking cough.
Defecation	<ol> <li>Bowel movement material.</li> <li>Bowel movement (act of).</li> <li>Excessive defecation.</li> <li>Gray colored stool.</li> <li>Dark brown liquid stool.</li> <li>Formed, yet soft stool.</li> <li>Formed with hardened stool.</li> <li>Infrequent bowel movements.</li> <li>Black stool.</li> </ol>	<ol> <li>Feces, stool.</li> <li>Defecation.</li> <li>Diarrhea, describe.</li> <li>Clay colored liquid stool.</li> <li>Highly colored liquid stool.</li> <li>Soft formed stool.</li> <li>Hard formed stool.</li> <li>Constipation.</li> <li>Black, tarry stool.</li> </ol>
Dizziness	Dizziness.	Vertigo.
Drainage	<ol> <li>Watery, from nose.</li> <li>Containing pus.</li> <li>Bloody.</li> <li>Consists of feces.</li> <li>Of serous fluid.</li> <li>Containing mucus and pus.</li> <li>Tough, sticky.</li> <li>From vagina (after delivery).</li> </ol>	<ol> <li>Coryza.</li> <li>Purulent.</li> <li>Sanguinous.</li> <li>Fecal.</li> <li>Serous.</li> <li>Mucopurulent.</li> <li>Tenacious.</li> <li>Lochia.</li> </ol>
Dressings	<ol> <li>A second dressing added to the first.</li> <li>Dressing removed, another applied.</li> <li>Drain tubes cut off.</li> <li>Drain taken out.</li> </ol>	<ol> <li>Dressing reinforced.</li> <li>Redressed.</li> <li>Drain tubes shortened (number of inches 4. Drain removed.</li> </ol>
Drop	A drop or drops.	Gtt.

Concerning	Observation	Term to use
Emesis	<ol> <li>Produced by effort of patient.</li> <li>Ejected to a few feet distant.</li> <li>If blood is only noticeable.</li> <li>Material vomited.</li> <li>Contents.</li> </ol>	<ol> <li>Induced.</li> <li>Projectile.</li> <li>Blood tinged.</li> <li>Vomitus, emesis.</li> <li>Describe color, odor, appearance, consistency.</li> </ol>
Eyes	<ol> <li>Sharpness of vision.</li> <li>Yellow in color.</li> <li>Puffy.</li> <li>Motionless.</li> <li>Sensitive to light.</li> <li>Double vision.</li> <li>Squinting.</li> <li>Abnormal protrusion of eyeball.</li> <li>Inflammation of conjunctiva.</li> </ol>	<ol> <li>Visual acuity.</li> <li>Jaundiced.</li> <li>Edematous.</li> <li>Staring.</li> <li>Photophobia.</li> <li>Diplopia.</li> <li>Strabismus.</li> <li>Exophthalmos.</li> <li>Conjunctivitis.</li> </ol>
Faint	Fainting.	Syncope.
Fever	<ol> <li>Without fever.</li> <li>Temperature above normal.</li> <li>Temperature greatly above normal.</li> <li>Temperature suddenly returns to normal.</li> <li>Temperature gradually returns to normal.</li> </ol>	<ol> <li>Afebrile.</li> <li>Pyrexia.</li> <li>Hyperpyrexia.</li> <li>Crisis.</li> <li>Lysis.</li> </ol>
Gas	<ol> <li>Gas in the digestive tract.</li> <li>Having gas in the digestive tract.</li> <li>Swelling of abdomen.</li> </ol>	1. Flatus. 2. Flatulence. 3. Distention.
Gums	Inflammation of the gums.	Gingivitis.
Hallucination	<ol> <li>Of hearing.</li> <li>Of sight.</li> <li>Of smell.</li> <li>Of taste.</li> </ol>	<ol> <li>Auditory hallucination.</li> <li>Visual hallucination.</li> <li>Olfactory hallucination.</li> <li>Gustatory hallucination.</li> </ol>
Hands	<ol> <li>Dirty, rough, nails broken.</li> <li>Abnormally large.</li> </ol>	1. Shows lack of care. 2. Massive.
Head	<ol> <li>Forehead.</li> <li>Region over temple.</li> <li>Back of head.</li> <li>Base of skull.</li> </ol>	<ol> <li>Frontal region.</li> <li>Temporal region.</li> <li>Occipital region.</li> <li>Basilar region.</li> </ol>
Hives	<ol> <li>Hives.</li> <li>Itching.</li> </ol>	1. Urticaria. 2. Pruritus.
Joints	<ol> <li>Bending.</li> <li>To straighten.</li> <li>Turn inward.</li> <li>Turn outward.</li> <li>Revolve around.</li> <li>Move away from median line.</li> <li>Move toward median line.</li> </ol>	1. Flexion. 2. Extension. 3. Inversion. 4. Eversion. 5. Rotation. 6. Abduction. 7. Adduction.
Legs	<ol> <li>Thigh to knee.</li> <li>Knee to ankle.</li> </ol>	<ol> <li>Upper leg (right or left).</li> <li>Lower leg (right or left).</li> </ol>
Lice	<ol> <li>Head, body, pubic.</li> <li>Condition of lousiness.</li> </ol>	Pediculi.     Pediculosis.
Mental attitude	All statements on charts concerning attitude ently" before them. These are the observe Only the patient knows for sure what his a second structful.  Hard to please. Distrustful. Happy. Sad. Afraid. Over religious. Lacks emotional control.  Loss of memory.	es must have "appears," "seems," or "apparer's interpretations of what he thinks he sees.  1. Irritable, fault-finding. 2. Distrustful, suspicious. 3. Optimistic, cheerful. 4. Depressed, moody. 5. Apprehensive, anxious. 6. Deeply religious. 7. Hysterical. 8. Amnesia.

Concerning	Observation	Term to use
Nourishment	<ol> <li>Very small amount of water.</li> <li>Small pieces of ice.</li> <li>Drink of water.</li> <li>Given through tube into stomach.</li> <li>Given by enema.</li> </ol>	<ol> <li>Sips water.</li> <li>Chipped ice.</li> <li>Water (number of cc.).</li> <li>Gavage.</li> <li>Nutritive enema, fluid and amount.</li> </ol>
Odor	<ol> <li>Not unpleasant.</li> <li>Like fruit.</li> <li>Very unpleasant.</li> <li>Belonging to particular drug, etc.</li> <li>Like feces.</li> </ol>	<ol> <li>Aromatic.</li> <li>Fruity.</li> <li>Offensive.</li> <li>Characteristic.</li> <li>Fecal.</li> </ol>
Pain	<ol> <li>Great pain.</li> <li>Little.</li> <li>Period of great pain followed by period of little or no pain.</li> <li>Spreads to distant areas.</li> </ol>	<ol> <li>Severe.</li> <li>Slight.</li> <li>Paroxysmal.</li> <li>Radiating.</li> </ol>
	5. Started all at once. 6. Hurts worse when moving.	<ul><li>5. Sudden onset.</li><li>6. Increased by movement.</li></ul>
Paralysis	<ol> <li>Of the muscles of the face.</li> <li>Of the legs.</li> <li>Of one side of body.</li> <li>Of a single limb.</li> <li>Both arms and legs.</li> </ol>	<ol> <li>Facial.</li> <li>Paraplegia.</li> <li>Hemiplegia.</li> <li>Monoplegia.</li> <li>Quadriplegia.</li> </ol>
Patient (admission of)	<ol> <li>Walking.</li> <li>Carried (infant).</li> <li>By wheelchair.</li> <li>By stretcher.</li> <li>Had a bedsore when admitted.</li> </ol>	<ol> <li>Ambulatory.</li> <li>In arms.</li> <li>Per wheelchair.</li> <li>Per stretcher.</li> <li>Decubitus ulcer present on admission; describe size and appearance.</li> </ol>
Perspiration	1. Large amount. 2. Small amount.	<ol> <li>Profuse diaphoresis.</li> <li>Scanty.</li> </ol>
Pulse	<ol> <li>Number of beats per minute.</li> <li>Rhythm.</li> <li>Beats missed at intervals.</li> <li>Over 100 beats per minute.</li> <li>Very rapid, beats indistinct.</li> <li>Slow in rate.</li> <li>One searcely perceptible.</li> <li>Small, rapid and tense.</li> </ol>	<ol> <li>Rate.</li> <li>Regular or irregular.</li> <li>Intermittent.</li> <li>Rapid.</li> <li>Running.</li> <li>Slow.</li> <li>Thready.</li> <li>Wiry.</li> </ol>
Reproductive organs	External reproductive organs.	Genitalia (external).
Respiration	See breathing.	
Restraint	<ol> <li>Boards put on bed.</li> <li>Tied down with sheet.</li> <li>Fastened to bed with ankle strap (right).</li> </ol>	<ol> <li>Sideboards applied.</li> <li>Sheet restraint applied.</li> <li>Right ankle strap applied.</li> </ol>
Rings	<ol> <li>Rubber ring to relieve pressure.</li> <li>Cotton rings applied under heels, elbows, etc.</li> </ol>	1. Placed on rubber ring. 2. Cotton ring applied to each heel, elbow, etc.
Skin	1. Normal. 2. Pink, hot. 3. Blue in color. 4. Very white. 5. Shines. 6. Raw surface. 7. Yellow in color. 8. Torn. 9. Containing colored areas. 10. Wet. 11. Scraped.	<ol> <li>Healthy.</li> <li>Flushed.</li> <li>Cyanotic.</li> <li>Extreme pallor.</li> <li>Glossy.</li> <li>Excoriation.</li> <li>Jaundiced.</li> <li>Lacerated.</li> <li>Pigmented.</li> <li>Moist.</li> <li>Abraded.</li> </ol>
	12. Black and blue mark 13. Cold, clammy.	12. Ecchymosis. 13. Cold, clammy.

Concerning	Observation	Term to use
Sleep	<ol> <li>Slept very little.</li> <li>Tired when wakens.</li> <li>Moans while sleeping.</li> <li>Inability to sleep.</li> </ol>	<ol> <li>Slept very little or slept at short intervals.</li> <li>Awakens fatigued.</li> <li>Sleep disturbed—moaning.</li> <li>Insomnia.</li> </ol>
Smoke	Smokes too much.	Smokes excessively.
Unconsciousness.	<ol> <li>Complete unconsciousness.</li> <li>Partial unconsciousness.</li> <li>Pretended unconsciousness.</li> </ol>	<ol> <li>In comatose condition.</li> <li>In stuporous condition.</li> <li>Feigned unconsciousness.</li> </ol>
Urination	1. To urinate. 2. No control over urination. 3. Burning when voiding. 4. Large amount of urine voided. 5. Total suppression of urine. 6. Frequent voiding at night. 7. Painful urination. 8. Pus in urine. 9. Blood in urine. 10. Hemoglobin in urine. 11. Glucose in urine. 12. Albumin in urine. 13. Acetone in urine. 14. Bile in urine. 15. Scantiness of urine. 16. Sugar in the urine.	<ol> <li>Void, urinate.</li> <li>Involuntary, incontinent.</li> <li>Burning sensation on urination.</li> <li>Polyuria.</li> <li>Anuria.</li> <li>Nocturia.</li> <li>Dysuria.</li> <li>Pyuria.</li> <li>Hematuria.</li> <li>Glucosuria.</li> <li>Albuminuria.</li> <li>Choluria.</li> <li>Oliguria.</li> <li>Glycosuria.</li> </ol>
Vomit	Desire to do so (for various types, see Emesis).	Nausea.
Weight	1. Overweight. 2. Thin, underweight.	1. Obese. 2. Emaciated.
Wounds	<ol> <li>Deep.</li> <li>Slight, surface only.</li> <li>Not infected.</li> <li>Discharging pus.</li> <li>Infected.</li> <li>Torn.</li> </ol>	<ol> <li>Deep.</li> <li>Superficial.</li> <li>Clean.</li> <li>Suppurating.</li> <li>Infected.</li> <li>Lacerated.</li> </ol>

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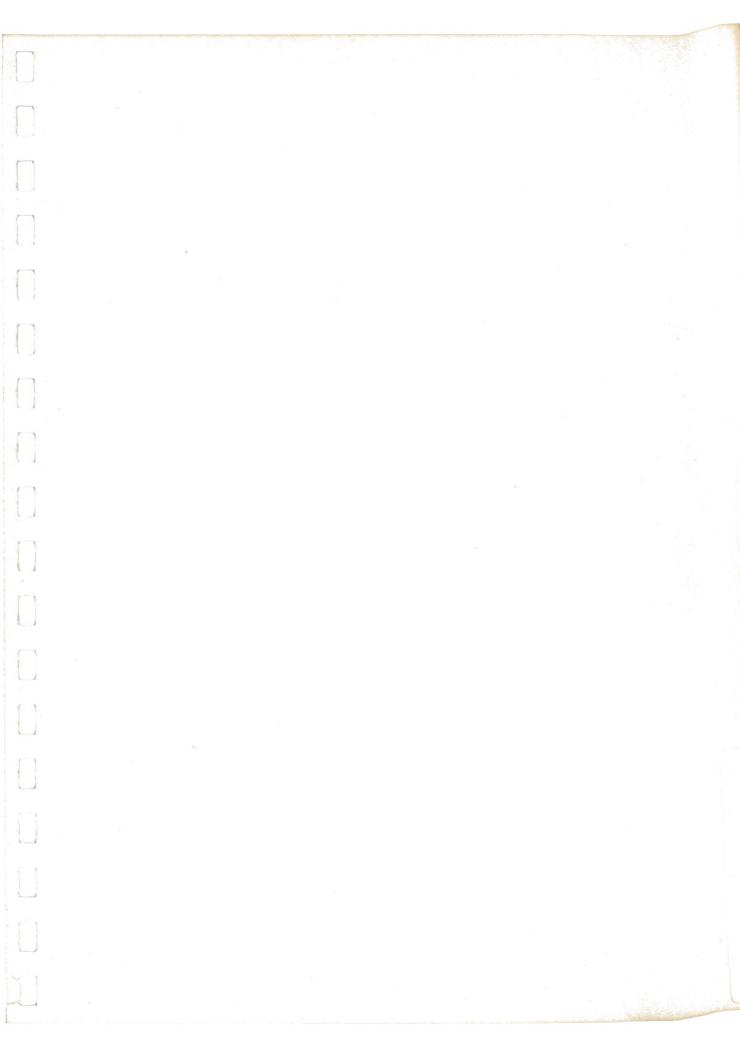
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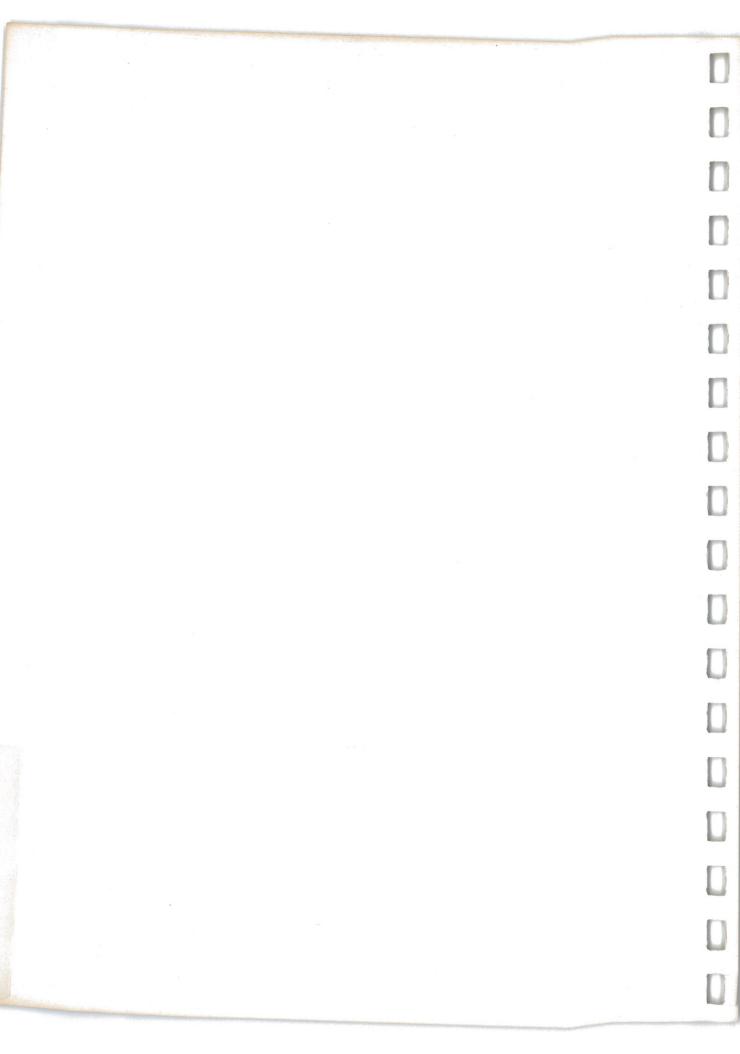
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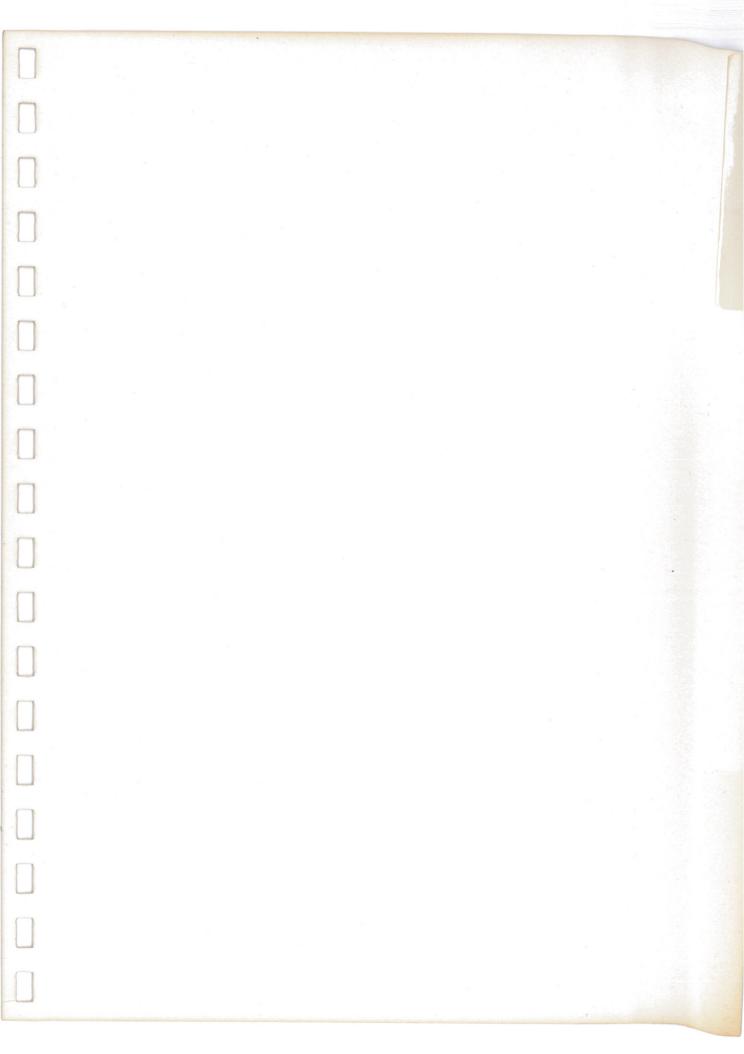
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### Chapter VII

## BASIC PHARMACOLOGY and REVIEW OF TOXICOLOGY\*

The substances used in the treatment of disease are obtained from the animal, vegetable, and mineral kingdoms, or are prepared synthetically. These substances are commonly referred to as medicines or drugs. It is necessary to learn their sources, composition, physical characteristics, chemical properties, methods of preparation and administration, and physiologic and toxicologic action. This section is concerned primarily with the action, use, and dosage of drugs. Further information with respect to source, composition and characteristics may be obtained by consulting the references at the end of this chapter.

Pharmacology is the science of the nature and properties of drugs, particularly their actions. It includes such allied fields as pharmacy, pharmacognosy, toxicology, posology, chemotherapy and therapeutics.

The science which relates to the properties of medical substances and the application of remedial agents in the treatment of disease is known as therapeutics. In addition to the use of drugs as remedial agents, the following are employed for curative purposes: electricity, water, serums and vaccines, light and X-rays, heat, hygienic agents, and physical, mechanical and operative measures.

The various preparations of drugs or the different forms in which they may be used are discussed in the chapter on Pharmacy (Chapter VIII).

### Administration of Medicines

The normal or adult dose of medicine is based upon the condition that the individual must weigh about 150 pounds.

In computing the dose for children, the following rules are applicable:

Young's rule directs that the age of the person be taken as the numerator of the fraction and the age plus 12 as the denominator. Thus for a child 3 years old, 3 would be the numerator, and 3 plus 12, or 15 the denominator,

$$\frac{3}{3+12}$$
=% of adult dose

Clark's rule is based on weight in pounds. The weight of the child is taken as the numerator of the fraction and the average adult weight, 150 pounds, as the denominator, multiplied by the adult dose,

$$\frac{\text{Weight of child}}{150} \times \text{the adult dose}$$

Of the two rules, Clark's rule is perhaps the more useful.

When the dose of a drug is spoken of, the therapeutic dose (the amount necessary to produce a medicinal effect in an adult) is ordinarily meant. The doses given in the *United States Pharmacopeia* and the *National Formulary* are average therapeutic doses and are known as "usual adult dose."

In most instances in this chapter, the specific route of administration is delineated; however, in those instances where it is not set out, the oral route is implied.

Some of the terms used in this section in connection with doses are significant and are as follows:

Dose Usual (average dose) is the amount of drug which may be expected ordinarily to produce the therapeutic effect for which the drug is most commonly employed.

Dose Ronge is intended as a guide with respect to seeking confirmation of prescriptions calling for unusually small or large doses.

Dose Recommended is different from "dose usual" in that "dose recommended" is the average unofficial dose as elicited from current literature.

In addition, there are the *minimum dose*, the smallest quantity which can produce a medicinal effect; the *maximum dose*, the largest quantity which can be given without probable poisoning or

<sup>\*</sup>Revised by Lt. Comdr. S. C. Pflag, MSC, USN. Head, Hospital Corps Career Planning and Training Branch; Head, Pharmacy Section, Professional Division, Bureau of Medicine and Surgery, Department of the Navy, Washington, D.C.

drug, it is essential that effective doses be administered.

Potassium Penicillin G (Benzyl Penicillin Potassium, Crystalline Penicillin Potassium G)

Action and Use.—Penicillin G may be given orally. This drug is effective against gram-positive bacteria, particularly against streptococcic, pneumococcic, and clostridial infections. It is also effective against gram-negative gonococcic and meningococcic infections. Because many strains of micrococci (staphylococci) have become resistant to penicillin therapy, it is of limited value and other antibiotics are indicated. It is effective in the treatment of bacterial endocarditis and anthrax, syphilis, Vincent's infection, and actinomycosis. It is prompt acting and lasts about 3 to 4 hours. For additional information see the discussion under Penicillin.

Dose Usual: Oral, 200,000 U.S.P. units 4 times a day

I.M., 50,000 units 4 times a day

Does Range: Oral, 50,000 to 1,000,000 units I.M., 25,000 to 1,000,000 units

Procaine Penicillin G (Depo-Penicillin®)

Action and Use.—See penicillin and penicillin G. The action is more prolonged than penicillin G.

Dose Usual: I.M., 300,000 U.S.P. units once or twice a day

Dose Range: 300,000 to 600,000 units

Benzathine Penicillin G (Bicillin®, Permapen®)

Action and Use.—This drug is a complex salt of penicillin. It is relatively insoluble in water and has a rather prolonged action in contrast to the soluble salts of penicillin G. It is absorbed from the gastrointestinal tract and is not destroyed by gastric juices. Orally it produces effective blood levels lasting from 6 to 8 hours. Administered intramuscularly, a single injection may produce effective blood levels lasting more than one week. The uses and actions of benzathine penicillin are similar to penicillin. It is particularly indicated whenever prolonged penicillin action is indicated. Hypersensitivity reactions are infrequent.

Dose Usual: I.M., 600,000 units

Dose Range: I.M., 300,000 to 3,000,000 units Oral, 200,000 to 300,000 units every 6 hours

® Trade Mark or proprietary name.

Phenoxymethyl Penicillin (Penicillin V)

Action and Use.—The action and uses of phenoxymethyl penicillin are similar to penicillin. Gastric juices will not inactivate this preparation as compared to salts of penicillin G. Symptoms of sensitivity when administered orally are infrequent, but are similar to those discussed under penicillin.

Dose Recommended: 200,000 units 3 to 4 times a day

Penicillinase (Neutrapen®)

Action and Use.—Although this drug is not an antibiotic, it is discussed under this section because it is employed in the treatment of penicillin reactions.

Penicillinase is produced by many strains of bacteria including micrococci (staphylococci) and Escherichia coli. It appears that penicillinase hydrolyzes penicillin to penicilloic acid, thereby destroying penicillin. Penicillin blood levels are reduced thereupon, for prolonged periods of time. This is a new injectable form employed in treating penicillin reactions characterized by fever, urticaria, pruritis, and arthralgia.

Side Effects.—Side effects are minimal and are restricted to local pain and tenderness at the site of injection.

Dose Recommended: I.M., 800,000 units

### MISCELLANEOUS ANTIBIOTICS

Bacitracin

Action and Use.—Bacitracin is bactericidal and effective against a wide variety of gram-positive organisms including hemolytic and nonhemolytic streptococci, micrococci (staphylococci) and pneumococci, anaerobic cocci and clostridia of the gas gangrene group, and certain meningococci. It is not effective against most aerobic gram-negative bacilli. It is used in the treatment of infections caused by susceptible micrococci (staphylococci) failing to respond to penicillin. Bacteria are slow to develop resistance to this drug, and sensitivity is rare. Bacitracin is employed locally by topical application in ointment form, or injected intramuscularly or directly into certain abscesses.

Dose Usual: Topical as ointment containing 500 units per gram

Chloromycetin®)

Action and Use.—Chloramphenicol is an anti-

biotic produced by the growth of Streptomyces venezuela and synthetically. It is effective in the treatment of rickettsial diseases, and is useful in the treatment of brucellosis, pertussis, staphylococic infections, and infection caused by Pseudomonas aeruguinosa, Escherichia coli, and Proteus vulgaris. It is the drug of first choice in treatment of typhoid fever. It is one of the most effective of antibiotics against a wide variety of gramnegative organisms and Rickettsia.

The serious and fatal blood dyscrasias and other toxic manifestations that may occur require caution and frequent blood studies. However, these are rare. Recent studies have revealed that chloramphenical is no more dangerous than other antibiotics and it is now one of the most frequently prescribed antibiotics.

Dose Usual: 3 grams daily

Dose Range: 2 to 8 grams

Chloromyhenicol Palmitate (Chloromycetin Palmitate $^{\text{(B)}}$ )

Action and Use.—Chloramphenicol palmitate is a relatively tasteless drug which has the same action and uses as chloramphenicol and possesses similar toxic effects.

Dose Usual: 3 grams daily Dose Range: 2 to 8 grams

Chlortetracycline Hydrochloride (Aureomycin Hydrochloride®)

Action and Use.—Chlortetracycline hydrochloride is the hydrochloride of several antibiotic substances produced by the growth of Streptomyces aureofaciens or by other means. It is a specific in the treatment of rickettsial diseases. It is effective in the treatment of primary atypical pneumonia, lymphogranuloma venereum, granuloma inguinale, brucellosis, tularem'a, herpes zoster, bacillary infections, urinary tract infections, acute infections, croup, whooping cough, acute bronchitis, otitis media, mastoiditis, acute anthrax, peritonitis, meningitis, abscesses, acute intestinal infections, gonorrhea and syphilis. is also of value in treatment of micrococcic (staphylococcic) and pneumococcic infections, the Shigella group of infections and in subacute bacterial endocarditis. It may be administered for preoperative and postoperative prophylactic measures in surgery of the large bowel. It is also used topically.

Side Effects.—It may produce nausea, vomiting, diarrhea and pruritis.

NOTE: The prolonged use of chlortetracycline may result in profound changes in the normal bacterial flora of the mouth, intestines, and vagina. Vitamin deficiencies (particularly the B complex vitamins) may also develop.

Dose Usual: 250 mg. 4 times a day Topical, as 3% ointment

Dose Range: 50 mg. to 1 gram

Erythromycin (Erythrocin®, Ilotycin®)

Action and Use.—Erythromycin is an effective drug against certain gram-positive bacteria. This drug is similar to penicillin in anti-bacterial activity and is effective against susceptible penicillin-resistant strains. It is effective against certain beta-hemolytic streptococci, pneumococci, and micrococci (staphylococci) in the treatment of intestinal amebiasis. The drug is useful for topical application in the treatment of pyogenic infections of the skin.

Side Effects.—Gastrointestinal disturbances are infrequent. There are several salts of erythroymcin which have the same action as the parent drug

Dose Usual: 300 mg. every six hours.

Dose Range: 200 to 600 mg.

Oxytetracycline Hydrochloride (Terramycin Hydrochloride®)

Action and Use.—Oxytetracycline hydrochloride is bactericidal. It is effective in the treatment of Rocky Mountain spotted fever, typhus, scrub typhus, Q fever, primary atypical pneumonia, lymphogranuloma venereum, nonspecific urethritis, beta-hemolytic streptococcic infections, certain bacillary infections, certain urinary tract infections, acute infectious croup, bronchitis, otitis media, acute anthrax, tularemia, and actinomycosis. It is also effective in treatment of gonorrhea, certain stages of syphilis, and whooping cough.

Side Effects.—Nausea, vomiting, and diarrhea may occur when this drug is given orally.

NOTE: Prolonged use of oxytetracycline results in suppression of the growth of intestinal bacteria, and the growth of yeast-like microorganisms may be encouraged resulting in the development of thrush or other forms of moniliasis.

Dose Usual: Oral, 250 mg. 4 times a day

I.V., 500 mg. daily

Dose Range: Oral, 1 to 6 grams

I.V., 500 mg. to 2 gram

Topical, as a 0.5% ophthalmic solution

Tetracycline Hydrochloride (Achromycin<sup>®</sup>, Panmycin<sup>®</sup>, Tetrabon<sup>®</sup>, Tetracyn<sup>®</sup>)

Action and Use.—The actions and uses of this drug are similar to chlortetracycline and oxytetracycline. It appears to be useful for topical application treatment of pyogenic infections. It appears to be more stable than the aforementioned tetracycline preparations.

Side Effects.—Nausea, vomiting, and loose stools may result.

NOTE: Prolonged use of tetracycline results in a suppression of the normal intestinal flora of bacteria which may cause an abnormal growth of molds and fungi. Vitamin deficiencies may also result. Staphylococci rapidly acquire resistance to any tetracycline hydrochloride and occasionally have emerged as pathogenic survivors or have established fatal secondary or superinfections following use of the antibiotic in treatment of pneumococcic infections of the respiratory tract.

Dose Usual: 250 mg. 4 times a day Dose Range: 50 mg. to 1 gram

### Neomycin Sulfate

Action and Use.—Neomycin sulfate is effective against certain gram-positive and gram-negative bacteria. It has a wider antibacterial spectrum than bacitracin, penicillin, and streptomycin. It is administered orally as a preoperative disinfectant in surgery involving the bowel or anus. It is used by intramuscular injection in certain serious systemic infections caused by gram-negative bacteria and in certain urinary tract infections and micrococcic (staphylococcic) infections. Neomycin is also used topically for infections of the skin and eye in ointment or solution form.

Side Effects.—Side effects have been reported in those receiving intramuscular injection of neomycin for several days. These include: partial to total, and transient to permanent deafness; vestibular dysfunction; renal damage (casts in urine, microscopic hematuria, and albuminuria); and increase in serum nonprotein nitrogen.

Dose Usual: 1 gram every 4 hours

Topical, as 0.5 ointment Dose Range: 4 to 10 grams daily

Nystatin (Mycostatin®)

Action and Use.—Nystatin is used to treat infections caused by *Candida albicans*. It is useful in the treatment of fungus infections (moniliasis) of the mouth and throat and certain cutaneous fungus lesions. Nystatin has been employed orally for suppression of intestinal fungi and yeasts.

Dose Recommended: 500,000 units 3 times a day
Topical, as ointment containing 100,000 units in
1 gram.

### Polymyxin B Sulfate

Action and Use.—This drug is an antibiotic that is bactericidal for gram-negative microorganisms. It is effective in certain bacteremias, meningitis, and urinary tract infections when administered intramuscularly. In certain meningeal infections, the drug should be given intraspinally. Administered orally, it is effective in treatment of certain intestinal infections such as Shigella; however, systemic absorption by this route is poor. It is also used topically for local infections.

Side Effects.—Dizziness and mild weakness may result, and occasionally albuminuria and nitrogen retention. Central nervous system effects may occur in man following parenteral administration of polymyxin. These effects include circumoral paresthesia, dizziness, mild ataxia and leg weakness.

Dose Usual: I.M. 750,000 U.S.P. units 4 times a

Topical, as a 0.1% ointment

Dose Range: 500,000 to 1,000,000 units

### Dihydrostreptomycin Sulfate

Action and Use.—Streptomycin and dihydrostreptomycin have essentially similar actions and uses. Originally they were used to treat a variety of conditions caused by gram-negative and grampositive bacteria; however, bacteria began to show resistance to these drugs, and now many authorities recommend the use of these drugs chiefly for the treatment of tuberculosis.

Side Effects.—Drug fever, dermatitis, toxicity involving the eighth cranial nerve, loss of hearing, and vertigo may result. Chronic toxic effects are manifest in transient or permanent vertigo and transient or permanent, partial or complete deafness. Streptomycin effects vestibular function, whereas dihydrostreptomycin damages the cochlear branch of the eighth cranial nerve.

Dose Usual: I.M. 500 mg. of base daily Dose Range: 500 mg. up to 1 gram

### Viomycin Sulfate

Action and Use.—Viomycin is an antituberculous agent effective against streptomycin-resistant strains of tubercle bacilli and isoniazid-resistant bacteria. Viomycin is more active than aminosalicylic acid. Combined with aminosalicylic acid, it exhibits a synergistic action. It is very useful in the treatment of certain types of tuberculosis. Because of its high potential toxicity, viomycin should not be used in treatment of tuberculosis where other drugs such as streptomycin are effective.

Side Effects.—Renal irritation, albuminuria, dizziness, loss of hearing, and skin eruptions may occur.

Dose Recommended: I.M., 1 gram every 12 hours
(2 grams per day) for 4
to 6 months

Novobiocin (Cathomycin®, Albamycin®)

Action and Use.—Novobiocin is highly effective against *Micrococcus* (Staphylococcus) pyogenes var. aureus including strains resistant to other antibiotics. This drug is also effective against certain strains of *Proteus vulgaris*. It is used in the treatment of cellulitis, carbuncles, skin diseases, infections, and so forth.

Dose Recommended: 250 mg. every 6 hours. Triacetyloleandomycin (Cyclamycin®)

Action and Use.—This drug is effective against strains of micrococci (staphylococci) resistant to penicillin and other antibiotics. It is effective against certain pneumococcic and streptococcic strains.

Dose Recommended: 250 mg. every 6 hours Ristocetin (Spontin®)

Action and Use.—Ristocetin is an antibiotic which is effective against many pathogenic gram-

positive cocci. This drug is very effective in the treatment of severe staphylococcic and enterococcic infection. Bacteriologic identification of staphylococci should be made before starting therapy. Ristocetin is most useful in those infections which are resistant to penicillin, tetracyclines, erythromycin, chloramphenicol, and other drugs. This drug is a valuable agent and may prove lifesaving in those patients with infections resistant to the antibiotics listed above.

Side Effects.—Ristocetin produces side effects such as a lowering of the white blood count; it may also be irritating to the veins and cause thrombophlebitis. Only dilute solutions are suitable for intravenous use. Skin eruptions and diarrhea may also occur.

Dose Recommended: I.V. 25 to 50 mg. per kg. body weight, daily, for staphylococcic infections

### SULFONAMIDES

There are two factors in the mechanism of action of the sulfonamides: (1) the direct action of the drug, producing a bacteriostasis; (2) the involvement of the defense forces of the host, the leucocytes. The drug inhibits the growth of the bacteria and allows the leucocytes to cope with the infection. Leucocytes are essential to the bactericidal action.

The essential growth substance of many bacteria is para-aminobenzoic acid. Since the sulfofonamides are similar in structure to para-aminobenzoic acid, they can displace it from the enzymatic reaction and inhibit the growth of the
bacterial cells. There must be enough sulfonamide present to displace all of the para-aminobenzoic acid, so large doses are necessary at the
beginning of therapy to build up the proper blood
level. Sulfonamides have no beneficial pharmacologic action aside from their effect on bacteria.

Side Effects.—Some patients experience toxic reaction such as cyanosis, nausea and vomiting, headache, dizziness, drug rash, and acidosis. Acute hemolytic anemia is not uncommon; leukemia may occur at any time; granulocytopenia may occur between the fifteenth and fortieth day of therapy. In treating these reactions, it is advisable to discontinue the drug, administer fluids, give sodium bicarbonate to overcome acidosis, give blood transfusions if necessary, and treat symptomatically.

When sulfonamide drugs are being administered, it is always desirable to determine the value of the sulfonamides in the blood and body fluids at frequent intervals.

#### Sulfadiazine

Action and Use.—Sulfadiazine is well tolerated in the body and reports of toxicity are infrequent. Effective blood levels with this drug are rapidly reached and sustained on therapeutic oral doses. A daily urine output above 1,000 ml. should be maintained to avoid urinary obstruction. Forced fluids and sodium bicarbonate are recommended with administration.

Sulfadiazine is effective in the treatment of pneumococcic pneumonia and meningococcic meningitis; genitourinary tract infections; in severe hemolytic streptococcic and micrococcic (staphylococcic) infections; and in other sulfonamide-susceptible infections.

Dose Usual: Initial, 4 grams then 1 gram every 4 hours

Dose Range: 500 mg. to 4 grams

### Sulfadiazine Sodium

Dose Usual: I.V., 4 grams in 5% solution; may be repeated in 8 hours

Dose Range: 500 mg. to 4 grams

#### Sulfamerazine

Action and Use.—Sulfamerazine is closely related chemically to sulfadiazine but is much more rapidly absorbed from the intestinal tract and more slowly excreted, so it need not be given as frequently or in as large doses to maintain proper blood levels. In a free state it is more soluble than sulfadiazine at any pH, and in the acetylated form it is less likely to have a toxic reaction on the kidney. It passes readily into the cerebrospinal, pleural, and abdominal fluids. An alkaline urine output above 1,000 ml. per day should be maintained. Sulfamerazine is used for the same purposes as sulfadiazine.

Dose Usual: Initial: 4 grams then 1 gram every 6 hours

Dose Range: 500 mg. to 4 grams

### Sulfacetamide

Action and Use.—This drug is similar in action to sulfamerazine and sulfadiazine but has the advantage of greater solubility in the urine and

has less tendency to produce deposits in the urinary tract. The sodium salt is used for topical treatment of the eye and it is reputed to be free of sensitization reactions.

Dose Usual: Initial: 4 grams then 1 gram every 4 hours

Dose Range: 500 mg. to 4 grams

#### Sulfacetamide Sodium

Action and Use.—The action of this drug is the same as that of sulfacetamide.

Dose Usual: Topical to eye, as 10% ointment; as 30% solution, 1 to 2 drops every 2 to 4 hours

### Sulfisoxazole (Gantrisin®)

Action and Use.—Sulfisoxazole is similar in action and uses to other sulfonamides. This drug is less likely to cause crystalluria due to its high solubility in body fluids as contrasted to the less soluble sulfonamide derivatives. This drug is particularly effective in urinary tract infections due to organisms of the Proteus group.

Dose Usual: Initial: 4 grams then 1 gram every 4 hours

Dose Range: 500 mg. to 6 grams

### Acetyl Sulfisoxazole (Gantrisin Acetyl ®)

Action and Use.—Acetyl sulfisoxazole is similar in action and use to sulfisoxazole. This drug has the advantage of being tasteless and is especially suitable for oral administration.

Dose Recommended: Initial: 4 grams, then 1 gram every 4 hours

### Succinylsulfathiazole (Sulfasuxidine ®)

Action and Use.—Succinylsulfathiazole is poorly absorbed from the intestional tract where it exerts a bacteriostatic effect against certain bacteria, particularly the gram-negative organisms such as Escherichia coli and dysentery bacilli Shigella shigae, Shigella flexneri, Shigella sonnei. Toxicity occurs infrequently. When administered in therapeutic doses it has an inhibiting effect on intestinal flora resulting in semifluid, practically odorless stools of low bacterial count. It is recommended for preoperative preparation and postoperative treatment of patients requiring surgical operations of the rectum, carcinoma of the colon, fecal fistula, and other operations of

the intestinal tract. It may be used in the treatment of acute bacillary dysentery. It can be administered for as long a period of time as necessary.

Dose Usual: 2 grams every 4 hours Dose Range: 1 to 3 grams

Phthalylsulfathiazole (Sulfathalidine)

Action and Use.—This drug is used in the treatment of intestinal infections caused by sulfonamide-susceptible organisms. It is useful in the treatment of inflammation of the intestinal tract and for the presurgical treatment of patients who are to be subjected to surgery of the small intestine or colon.

Dose Usual: 1.5 grams 4 times a day Dose Range: 4 to 8 grams daily

Sulfamethoxypyridazine ( $Kynex^{\text{@}}$ ,  $Midicel^{\text{@}}$ )

Action and Use.—This is a new sulfonamide which is very soluble and slowly excreted. Because excretion is slow, a single dose of 2 grams will maintain therapeutic blood levels for 72 hours. This drug is particularly useful for urinary tract infections and for infections due to sulfonamide-sensitive organisms. It appears useful in preventing recurrent micrococcic (streptococcic) infections in rheumatic fever.

Side Effects.—The usual precautions taken with sulfonamide therapy should be observed, as blood dyscrasias and kidney malfunction may result.

Recommended Dose: 2 grams first day and 0.5 gram daily thereafter.

### GENERAL ANESTHETICS

General anesthesia is loss of sensation affecting the whole body. It is essential when complete unconsciousness and adequate muscular relaxation are desired, when movement of the patient may imperil the success of the operation, in lengthy operations, and where spinal anesthesia is not safe, as in thoracic surgery. The anesthetics which are administered by inhalation have the safety factor of being eliminated from the blood very rapidly. Being volatile, they are excreted quickly by the lungs.

The loss of sensation appears to be due to an effect on the spinal cord and appears before complete loss of consciousness. In sufficient doses,

the anesthetics eventually paralyze the spinal cord, the cerebrum, the vital centers in the medulla, usually affecting first the respiratory and later the vasomotor mechanism.

The stages of anesthesia are:

1. Analgesia, in which the patient experiences a feeling of warmth all over the body, possible suffocation, and local irritation of the eyes. Sensation gradually diminishes and pain is abolished. The skin of the face and neck is flushed. The pupils dilate as the patient passes into the second stage.

2. Delirium or excitement, accompanied by marked involuntary motor activity. The pulse is accelerated, respiration hurried and often irregular, the skin flushed and warm, the pupils

dilated but contract readily to light.

3. Surgical anesthesia, in which there is a complete loss of sensation, with unconsciousness. The patient is in a deep stupor from which he cannot be aroused. Most of the reflexes are abolished, although certain ones, as the respiratory, may be retained. The muscles are relaxed but keep their tone. Respiration is full and regular. The pulse is usually full and blood pressure normal, but both start to fall as the fourth stage approaches.

4. Medullary paralysis, the stage of collapse and danger. The relaxation becomes more complete and there is often a loss of muscular tone giving rise to danger signals such as stertorous respiration and changes in facial expression. The pulse is rapid and feeble, respirations shallow and far apart, the skin pale (often a peculiar cyanotic pallor), the pupils widely dilated. All reflexes lost. Death may be due to respiratory failure, as with ether, or to cardiac failure, as with chloroform.

Ether

Action and Use.—Ether is a very popular anesthetic, although it has certain undesirable features, particularly its slowness of action and postoperative effect. It is a comparatively safe anesthetic. There is some respiratory depression in the third stage but not a dangerous amount. Its depression of circulation is negligible compared with that of many other anesthetics. It is administered by inhalation.

CAUTION: Ether is highly flammable. Ether should not be used for anesthesia if it has been

removed from the original container longer than 24 hours.

### Chloroform (Trichloromethane)

Action and Use.—Chloroform is not flammable. As an anesthetic, chloroform is much less disagreeable than ether, but in most cases it is decidedly more dangerous. It is more depressant to the heart and respiration, more harmful to the liver, and more irritating to the skin and mucous membranes. Since chloroform is less volatile than ether, it is used mostly in the warmer climates. It is more powerful than ether, requiring only one-eighth the amount of ether to produce anesthesia. Chloroform is a powerful motor depressant in certain convulsions, such as those of strychnine poisoning. Occasionally it is used as a sedative in cough mixtures.

CAUTION: Care should be taken not to vaporize chloroform near a naked flame because of the production of noxious gases.

### Cyclopropane (Trimethylene)

Action and Use.—Cyclopropane was introduced in 1930 as a safe and potent anesthetic. Induction with this gas is pleasanter than with ether. There is no respiratory irritation and laryngospasm, and no respiratory depression with deep surgical anesthesia. Blood pressure is little affected with anesthetic concentrations.\* The cardiac rate may be slowed during the surgical stage. Muscular relaxation is usually quite sufficient. Administered expertly, cyclopropane can be used safely in almost every type of operation, including obstetrical surgery. Its use allows adequate oxygen throughout all depths of anesthesia, and there is a wide margin of safety between anesthetic and toxic concentrations.

CAUTION: Cyclopropane is highly flammable. A mixture of it with oxygen or air will explode when ignited. Because it is highly flammable, caution must be observed in the use of the cautery or electric knife.

### Vinyl Ether (Divinyl Oxide, Vinethene®)

Action and Use.—Vinyl ether acts quickly and recovery is correspondingly rapid. It is used for operations of short duration, or for induction with other anesthetic agents. It is used by inhalation.

CAUTION: Do not use if the original container has been opened longer than 48 hours.

### Ethyl Chloride

Action and Use.—Ethyl chloride is very flammable and must not be used near a flame. It was originally used to produce local anesthesia by freezing because of the rapidity with which it evaporates from the skin. This form of anesthesia has several disadvantages: dissection of frozen tissue is difficult, the process of thawing is painful, and freezing injures cells, lower's resistance to infection, and delays healing. Ethyl chloride may be used as a general anesthetic by inhalation or as a local or topical anesthetic by spraying in order to produce freezing. It is generally employed in operations of short duration or to induce anesthesia prior to the administration of ether.

### Ethylene

Action and Use.—Ethylene is a rapid, smooth, and pleasant induction agent which causes good muscular relaxation.

CAUTION: Ethylene is highly flammable. Do not expose to open flame.

### Nitrous Oxide (Nitrogen Monoxide)

Action and Use.—Nitrous oxide is usually employed with an adequate amount of oxygen in general anesthesia of a somewhat prolonged nature. It may produce an intoxication during which the patient may laugh and become quite talkative. It is commonly used in dentistry or as a preinduction agent to other general anesthetics. It does not produce adequate relaxation and therefore it is most often used in conjunction with other anesthetic agents. It is available in steel cylinders.

CAUTION: High concentrations of nitrous oxide may cause cyanosis and asphyxia.

### Thiopental Sodium

See Barbiturates, this chapter, for a complete discussion of this drug.

### BASAL ANESTHETICS

Basal anesthesia is the production of unconsciousness by certain agents prior to general anesthesia. It is produced by giving preanesthetic medication. It permits the patient to be brought to the operating room in an unconscious state, but not sufficiently depressed for surgery. Other drugs used for this purpose, in addition to those listed below, are morphine and scopolamine (see Index).

Tribromoethanol Solution (Bromethol)

Action and Use.—Tribromoethanol has a depressant action on the central nervous system similar to that of chloroform. The patient often falls asleep in a short time, and the maximum effect takes place in from 20 to 30 minutes. At the end of an hour the anesthesia becomes lighter and consciousness is regained in about 2 or 3 hours. Postanesthetic recovery is usually pleasant. Tribromoethanol is administered rectally and can be given to apprehensive patients without their knowledge. The official tribromoethanol solution is the form used. In proper doses it rarely causes serious respiratory effects.

Dose Usual: Rectal, .06 to .08 ml. per kg. body weight. The total amount administered should not exceed 8 ml. for women or 10 ml. for men, regardless of body weight.

#### LOCAL ANESTHETICS

The important action of this group of drugs is paralysis of the peripheral sensory nerves. They abolish all sensations, including taste and smell, although their chief effect is on the nerves of pain. Their effect is local and they must be brought in contact with the nerve in effective concentration. Some must be injected in the area of the nerve, while others can penetrate the mucous membranes. For various surgical purposes they can be injected subcutaneously, producing anesthesia in a small area, into one of the larger nerve trunks to anesthetize a considerable area, or into the spinal canal producing an anesthesia suitable for operation on the abdomen or lower extremities. nephrine is frequently given with local anesthetics to constrict the blood vessels, thus prolonging the anesthesia and lessening hemorrhage.

CAUTION: Local anesthetics produce some undesirable effects. They stimulate the central nervous system, sometimes producing restlessness and tremors followed by convulsions, and they may also produce circulatory stimulation or depression, depending on the drug. Barbiturates may be used to counteract the central nervous system stimulation.

#### Cocaine Hydrochloride

Action and Use.—As a local anesthetic, cocaine is used only by topical application. It penetrates

the mucous membrane rather readily. Cocaine is a vasoconstrictor and mydriatic; these properties are not found in other local anesthetics. It is seldom used in the treatment of the eye in high concentrations because of its mydriatic effect and harmful action on the cornea. For this reason it has been replaced by certain synthetic drugs. The sale of cocaine is regulated by the Harrison Narcotic Law.

Toxicology.—Acute poisoning. The symptoms are quickened respiration and pulse rate, excitement, dilated pupils, dry throat, headache, vertigo, confusion, and convulsions. The stimulation is succeeded by depression, and death may occur from respiratory failure.

Treatment.—The treatment consists of gastric lavage and symptomatic treatment (with particular attention to respiration and circulation), and intravenous injections of short-acting barbiturates.

CAUTION: It is never administered by injection because it is a general protoplasmic poison.

Dose Usual: Topical as 2 to 5% solution to mucous membranes

Procaine Hydrochloride (Neocaine, Novocain®)

Action and Use.—Procaine is administered only by injection. It is about one-fourth as toxic as cocaine when injected. It is used for infiltration anesthesia nerve block, or spinal anesthesia, in doses of 100 to 150 mg. For nerve block, a 1 or 2 percent solution is usually employed.

Dose Usual: Subcutaneous, as a 1 to 2% solution Intraspinal, up to 150 mg. as a 1 to 5% solution

Tetracaine Hydrochloride (Pontocaine Hydrochloride®)

Action and Use.—Tetracaine hydrochloride is a local anesthetic with actions similar to those of procaine hydrochloride, but is effective when applied to mucous membranes in lower concentrations. It is used for surface anesthesia in the eye, nose, and throat and in spinal anesthesia in which the anesthesia is prolonged.

Dose Usual: Intraspinal, 2 to 15 mg. as a 0.5% solution

Infiltration, 0.1 to 0.25% solution Topical, 0.5% solution in eye; 2% solution for nose or throat

Dose Range: Intraspinal, 2 to 20 mg.

Lidocaine Hydrochloride (Xylocaine Hydrochloride®)

Action and Use.—This is a relatively new local anesthetic. It is considerably more potent than procaine hydrochloride. It may be combined with epinephrine hydrochloride to delay absorption and prolong action. Local toxic effects are considered rare as compared to procaine hydrochloride. It is used for infiltration and block anesthesia in dental and general surgical procedures and is effective when applied topically to mucous membranes.

CAUTION: Total dosage injected in 24 hours should not exceed 0.5 gram per patient when used with epinephrine hydrochloride.

Dose Recommended: Infiltration anesthesia, concentration of 0.5%

Nerve block, concentration of 1.0 to 2.0%

Topical, concentration of 2.0%

Dental use, 2% solution with epinephrine hydrochloride 1:100,000

Ethyl Aminobenzoate (Benzocaine, Anesthesin)

Action and Use.—Because of its low solubility, ethyl aminobenzoate is usually prescribed as a local anesthetic in the form of dusting powders for relief of pain in wounds, in lozenges for throat irritations, in ointment for itching in various skin diseases.

Dibucaine Hydrochloride (Nupercaine Hydrochloride®)

Action and Use.—Dibucaine hydrochloride is used as a topical anesthetic on mucous membranes and for infiltration, and as a spinal and caudal anesthetic by injection.

CAUTION: In view of its high toxicity, it should be employed only by those throughly familiar with the drug and the techniques of local anesthesia.

Dose Usual: Infiltration, 1 to 50 ml. of 1 in 1,000 solution

Dose Range: 1 to 50 ml.

Hexylcaine Hydrochloride (Cyclaine Hydrochloride®)

Action and Use.—Hexylcaine hydrochloride is a soluble local anesthetic. It is employed for surface

infiltration and spinal anesthesia. It is also used for nerve block. Hexylcaine has a rapid onset and is longer acting than an equal concentration of procaine when used for infiltration and nerve block.

Dose Recommended: Infiltration anesthesia, 5 to 65 ml. of 1% solution
Nerve block, 2 to 10 ml. of 1% solution
Surface anesthesia, up to 5% concentration

# ANTISEPTICS, GERMICIDES, FUNGICIDES, AND PARASITICIDES

The members of this group are chiefly employed by topical application for their local effect, but some are administered internally for their local action as in urinary or intestinal antiseptics. Germicides kill all microorganisms, bactericides kill only bacteria.

#### Coal Tar

Action and Use.—Coal tar contains the phenols, cresols, naphthalenes, and like substances which give it disinfectant and local anesthetic properties. It is used in the treatment of various skin diseases to relieve itching and combat inflammation. It is usually prescribed in the form of ointment. If used for too long a period, it may cause severe dermatitis.

Dose Usual: Topical, as 3% ointment or as 20% solution (Liquor Carbonis Detergens)

Phenol (Carbolic Acid, Phenolic Acid, Phenolic Alcohol)

Action and Use.—Locally, phenol is a general protoplasmic poison. In high concentration it precipitates protein. It is toxic to all types of cells and when applied to the skin it causes blanching, followed by sloughing of the tissue. It also has a local anesthetic effect. In adequate concentrations it is fungicidal and bactericidal. The bactericidal efficiency is reduced by cold and alkaline media and is greater in aqueous solution than in glycerin or fats. (Liquefied phenol is phenol maintained in a liquid condition by the presence of 10 percent of water, and is a formulation which facilitates the dispensing of concentrated phenol.)

Phenol has a marked effect, first stimulating and then depressing, on the central nervous system particularly on the spinal cord. The blood pressure is lowered and circulation is greatly depressed.

Phenol is occasionally used to disinfect inanimate objects. Well diluted, it is employed as an antipruritic in lotions or ointments. Aqueous solutions stronger than 2 percent should not be used. Phenol is added as a preservative to preparations in ampuls. It is also used as a standard for comparison of disinfectant power. The "phenol coefficient" of a substance is a number indicating the disinfectant value of that substance as compared with phenol.

Toxicology.—The symptoms are local corrosion of the tissues (blanching), accompanied by severe pain; vomiting, the vomitus having the odor of phenol; general capillary damage resulting in low blood pressure; cold sweat, a marked fall in body temperature; scanty urine containing albumin, casts, and free hemoglobin usually green to black in color; shock soon followed by death from respiratory failure.

Treatment.—The only available treatment is symptomatic and supportive:

- 1. Gastric lavage, using olive oil, which dissolves the phenol and delays absorption. (Do not use mineral oil, alcohol, or glycerin.)
- 2. Allow some olive oil to remain in the stomach to act as a diluent and demulcent.
- 3. Administer saline injections to promote diuresis and protect the kidneys.
- 4. Give other symptomatic treatment as neces-
- 5. If phenol is spilled on the skin, it can be removed effectively with alcohol or castor oil.

Dose Recommended: Topical, as 2% ointment Hexachlorophene (Gamophen ®)

Action and Use.—This is an antibacterial agent which is incorporated in soap, detergents, creams, and so forth, in concentrations from 1 to 3 percent. These concentrations are effective in reducing the number of bacteria in the skin. Daily applications in the form of a soap or other vehicle will cause a marked reduction of bacteria in the skin. Alcohol or other organic solvents are to be avoided since they wash residual hexachlorophene away. It is also employed for preoperative disinfection of the skin. Some of the soaps marketed today contain this ingredient.

#### Cresol

Action and Use.—Cresol is a mixture of orthocresol, metacresol and paracresol. It is a much more powerful disinfectant than phenol. In the form most used, saponated cresol solution (Lysol, Compound Cresol Solution) it is used principally for disinfecting inanimate objects. It is about as poisonous as phenol, and the symptoms and treatment are the same.

## Resorcinol (Resorcin)

Action and Use.—The physiologic properties of resorcinol resemble those of phenol but it is about one-third as active as a fungicide or germicide. It is used principally in the form of an ointment or lotion as treatment for skin diseases. It is chiefly used locally in the management of acne and seborrheic dermatitis of the scalp and smooth skin.

Dose Usual: Topical, as a 10 to 20% ointment or paste

## Undecylenic Acid

Action and Use.—Undecylenic acid is a fatty component of sweat, used as a fungicide in ointments, dusting powders, and solutions. Zinc undecylenate is also so used.

Dose Usual: Topical, as ointment, 1 to 10% lchthammol (Ammonium Ichthosulfanate, Ichthyol $^{\circledR}$ )

Action and Use.—Ichthammol is a demulcent, emollient, and antiseptic. It is used in the treatment of skin disorders and to promote healing in chronic inflammations, usually in the form of the ointment but sometimes as a suppository.

Dose Recommended: Topical as 10% ointment

#### Chrysarobin

Action and Use.—The chief active constituent is largely a complex mixture of reduction products of chrysophanic acid. Chrysarobin is used as a parasiticide in the treatment of parasitic skin disease, such as psoriasis and ringworm. It is one of several effective agents used in psoriasis. It is usually employed in ointments. Chrysarobin is absorbed through the skin and appears in the urine, coloring it red. Unless well diluted, it is very irritating to the skin.

Dose Recommended: Topical, as 6% ointment

### Benzyl Benzoate

Action and Use.—Benzyl benzoate is the benzyl ester of benzoic acid. Applied in the form of a lotion, it is effective as a scabacide and for the eradication of head lice. It is applied in strengths varying from 10 to 30 percent, but is gradually being replaced by the newer preparations. Saponated benzyl benzoate is a concentrate which is diluted in water to make a lotion.

Dose Usual: Topical, benzyl benzoate 25% as lotion over entire dampened body except the face. Adults require 120 to 180 ml.

Gamma Benzene Hexachloride (Kwell®, Gexane)

Action and Use.—Gamma benzene hexachloride is a very effective pediculicide and scabicide. It is used in 1 percent ointment or lotion forms. This drug may be toxic if applied too frequently since it can be absorbed through the skin. A single application is usually sufficient to eliminate the parasites. This drug may be irritating to the eyes.

Dose Usual: Topical, as 1% ointment or lotion, 1 ounce

## Crotamiton (Eurax®)

Action and Use.—Crotamiton is a new and effective scabicide when employed topically in a 10% ointment or lotion. It is also used as an antipruritic. Side effects are rare.

Dose Usual: Topical, as 10% ointment, 30 grams

Precipitated Sulfur

Action and Use.—Sulfur has both germicidal and fungicidal action. In contact with the skin it is converted into pentathionic acid which accounts for its therapeutic activity. It is also a parasiticide. When taken internally, it has a cathartic action. Sulfur is used in the treatment of various skin diseases such as ringworm, scabies, psoriasis, seborrhea and eczema.

Sublimed sulfur and washed sulfur are also used. Washed sulfur may be used in the same way as precipitated sulfur. Sublimed sulfur is very seldom used in skin preparations because its crystalline structure has an irritating effect.

Dose Usual: Topical, as scabicide, 10% ointment for 3 nights

Peruvian Balsam (Balsam of Peru)

Action and Use.—Peruvian balsam is used as a stimulating and protective dressing in indolent ulcers and for its antiseptic and fungicidal properties in the treatment of epidermophytosis.

Dose Usual: Topical, as 4% ointment

#### lodine

Action and Use.—Iodine is used chiefly as a skin disinfectant for application to wounds and abrasions. A 2 percent solution is used for application to mucous membranes. It is also employed in the treatment of skin infections due to bacteria and fungi. It is sometimes used to sterilize water; one drop in a quart of water will disinfect it against bacteria and amebae. Iodine is an effective chemical antidote for alkaloidal poisonings.

Iodine is effective as a germicide against all bacteria. It is unique in showing little selective action; the concentration necessary for disinfection is practically the same for all microorganisms.

It is also an effective fungicide.

Side Effects.—Some patients may have an idiosyncrasy for iodine and may develop a skin rash even from local application.

Toxicology.—Its toxic effects are largely due to corrosive action on the gastrointestinal tract. The symptoms are epigastric and abdominal pain; diarrhea, possibly with bloody stools; brown stain on the mucous membrane of the mouth; vomiting. If starch is present in the stomach the vomitus may be blue. The large amount of fluids lost in diarrhea and vomiting may result in shock. Death is caused by shock, acute corrosive gastritis, and asphyxiation due to edema of the glottis.

Treatment.—The treatment consists of gastric lavage with chemical antidotes such as starch or solution of sodium thiosulfate followed by symptomatic treatment.

Dose Usual: Topical, iodine tincture, 2%
Internal, strong iodine solution (Lugol's), 5% iodine and 10% potassium iodide—0.3 ml. (5 min.) 3 times a day (as source of iodine for goiter and so forth)

Benzalkonium Chloride (Zephiran Chloride)

Action and Use.—Benzalkonium chloride is one of the antiseptics of the cationic type, in which the active ion bears a positive charge. It is used in

various concentrations as a disinfectant and fungicide. Solutions have a low surface tension and foam when shaken. The benzalkonium ion is incompatible with anionic wetting agents including soap (which should not be used with it or before it for disinfecting the skin). In addition, benzalkonium chloride is used for sterile storage of metal instruments and rubber articles. For this a 1:5,000 to 1:1,000 solution should be used. When used for metal instruments, to each liter should be added 2 grams of sodium nitrite and 5 grams of sodium bicarbonate to prevent rust.

Dose Usual: Topical, as skin disinfectant 1: 1,000 solution; as wet dressing and irrigant, 1: 10,000 to 1: 5,000 solution

## OXIDIZING ANTISEPTICS

These drugs are toxic to microorganisms because they liberate nascent oxygen which exerts a germicidal action by oxidizing the constituents of the bacterial protoplasm. The microorganisms most susceptible to their action are the grampositive bacteria and certain spirochetes and trypanosomes. The antiseptics of this group differ in the ease with which oxygen is liberated.

Hydrogen Peroxide Solution (Hydrogen Dioxide, Solution Peroxide)

Action and Use.—Hydrogen peroxide solution is an active germicide only while it liberates oxygen. It deteriorates on standing or on contact with many oxidizing and reducing substances. It is decomposed by heat, light, and agitation. The solution is used most extensively in full or half strength in the cleansing of wounds. It is effective as a mouth wash in treatment of Vincent's angina and is a beneficial irrigation in the treatment of *Trichomonas vaginalis* vaginitis. It is also employed to loosen impacted wax in the ears.

Dose Recommended: Topical, as wound prophylaxis 1½ to 3% solution; as mouth wash 3% solution; as vaginal irrigant, 2% solution

#### Sodium Perborate

Action and Use.—Sodium perborate is a powerful oxidizing agent. It is used as an antiseptic and as a fungicide in the treatment of athlete's foot and other fungus skin infections, by soaking.

Solutions are employed to oxidize the venom in snake bites. It is used as a wet dressing in treatment of poison ivy, and in solutions as a chemical antidote for poisoning by various drugs.

Dose Recommended: Topical, 2% solution as mouth wash; 5 to 10% with talc as fungicide

#### CHLORINE DISINFECTANTS

Chlorine disinfectants act by liberating free chlorine. In medicine this action has been utilized by the employment of chlorinated lime and alkaline solutions of sodium hypochlorite and potassium hypochlorite. Hypochlorite preparations are fairly stable in the presence of alkali, and alkaline hypochlorite preparations have the added advantage that the alkali has a destructive and solvent action on most bacteria and other organic matter. In the treatment of infected wounds with hypochlorite solutions, an excessive degree of alkalinity is considered objectionable on the ground that it causes destruction of normal tissue and irritation of the skin.

The term "available chlorine" refers to the amount of chlorine which can be liberated from a compound. The chlorine disinfectants are used principally as surgical antiseptics, wound dressings, and irrigations.

# Sodium Hypochlorite Solution (Clorox®)

Action and Use.—Sodium hypochlorite diluted with about 4 to 10 parts water is used as a foot bath for prophylaxis against ringworm and other fungus infections. It is also used to disinfect inanimate objects. It is too strong to be applied to wounds. Labarraque's Solution, which is used as a cloth bleach, may be prepared by diluting sodium hypochlorite solution with equal parts of water.

CAUTION: This solution is not suitable for application to wounds.

Dose Recommended: Topical, as solution (1 to 4 dilution) according to condition to which applied

#### Diluted Sodium Hypochlorite Solution

Action and Use.—This solution also known as Modified Dakin's Solution, is used as a surgical antiseptic, particularly for suppurating wounds,

where it also dissolves necrotic tissue. As with all hypochlorite antiseptics, it has the disadvantage of dissolving blood clots, delaying clotting, and dissolving ligatures, catgut, silk, and horsehair.

Chloroazodin (Azochloramid®)

Action and Use.—Chloroazodin is used in the form of solutions or ointments as a surgical antiseptic and as an irrigation for deep wounds and pus pockets and superficial suppurating wounds. Glyceryl triacetate (Triacetin) is used as its solvent.

Dose Recommended: Topical, as 2.6% solution

#### SILVER PREPARATIONS

Silver preparations have a wide variety of uses as caustics, astringents, antiseptics, and germicides. Their activity resides in the silver ion which is a protein precipitant. It is toxic to bacteria by precipitating the protein in the bacterial protoplasm. It exerts the same action on body tissue, the ion present in the active silver salts being particularly potent.

Silver compounds are of two types, the simple silver salts which ionize readily in solution, and the colloidal silver preparations in which the silver does not exist to any large extent as free ions. The two classes differ greatly in their pharmaco-

logic action.

The simple silver salts are highly germicidal. Only one, silver nitrate is official. They are very destructive to tissue and may be classed as caustics and corrosives as well as germicides. They have two stages of action: (1) the immediate germicidal and irritant action due to precipitation of protein by the free silver ion; (2) the milder and sustained antiseptic effect brought about by the formation of a protein silver compound which slowly liberates small amounts of ionic silver. Colloidal silver compounds, which contain very little ionizable silver, exert only the second action. Use of any silver preparation over a long period may cause a discoloration of the skin and mucous membrane known as argyria.

The collodial silver preparations contain high concentrations of silver, largely in nonionized form. Their antiseptic value depends on the activity of the free silver ions and not on their content. They do not precipitate protein but penetrate the tissues more readily than does silver

nitrate. Those mentioned here are silver proteins and silver halides.

Colloidal silver preparations have been used as antiseptics, particularly for application to the mucous membranes of the eye, nose, throat, urethra, bladder, and colon. They are commonly used for infections of the upper respiratory tract. They are dispensed in the form of solutions, ointments, swabs, suppositories, and tampons.

#### Silver Nitrate

Action and Use.—Silver nitrate is used in solutions varying from 0.01 to 1 percent. It is used as a mild antiseptic and astringent in irrigations of the bladder and urethra; as a germicide in treatment of infected ulcers of the mouth and throat; applied to the eyes of the newborn as a prophylaxis against gonorrheal conjunctivitis; in concentrated solution as a styptic.

Toxicology.—Ingestion of corrosive silver nitrate is responsible for most cases of silver poisoning. The symptoms are gastroenteritis, convulsions, profound changes in respiration, paralysis, and coma.

Treatment.—The treatment consists of the prompt administration of a chemical antidote such as any soluble non-toxic chloride, sulfate, soap, or weak alkalis, followed by symptomatic treatment.

Dose Usual: Topical as ophthalmic prophylaetic in newborn, 1% solution.

Dose Range: Topical 0.1 to 10% solution.

Toughened Silver Nitrate (Silver Nitrate Pencils, Fused Silver Nitrate, Lunar Caustic)

Action and Use.—Toughened silver nitrate, molded in pencil-shaped "stick" form, is caustic and escharotic and is used in removal of warts and corns, cauterization of wounds, and removal of granulation tissue. The stick is usually dipped into distilled water and applied to the desired area for a period of time according to the degree of action desired.

Mild Silver Protein (Mild Protargin, Argyrol, Silvol) Colloidal Silver Iodide (Neo-silvol®)

Action and Use.—Their therapeutic uses are discussed under colloidal silver preparations (see above).

CAUTION: Solutions should be freshly prepared and dispensed in amber-colored bottles.

Dose Recommended: 5 to 50% solution

#### COPPER SALTS

Copper salts are germicidal and fungicidal astringents. They are used in the treatment of fungus infections and since their astringent action makes them irritant to the stomach, they are sometimes employed as emetics in poisoning.

Cupric Sulfate (Copper Sulfate, Blue Stone, Blue Vitriol)

Action and Use.—Cupric sulfate is commonly used as a fungicide and also as an astringent in treatment of chronic conditions of the mucous membrane. It is given as an emetic in poisoning and as a chemical antidote in phosphorus poisoning. It is used as a hematinic in combination with iron salts, to aid in the utilization of iron in the body.

Toxicology.—The symptoms are a metallic taste in the mouth, nausea, vomiting, severe pains in the stomach, and violent headache. The tissue with which it came in contact may be stained black. The stools are frequent, black, and bloody; the urine is yellow and there is pain on voiding. There may be convulsions, followed by death.

Treatment.—Treatment, largely symptomatic, is as follows:

- 1. Give the chemical antidote, potassium ferrocyanide, which forms an insoluble cupric ferrocyanide or BAL.
- 2. Soap, alkalis, albuminous drinks, or milk will serve as chemical antidotes.
- 3. They all form insoluble compounds which should be removed by gastric lavage.
  - 4. Symptomatic treatment.

Dose Recommended: As emetic, 300 mg. in warm water

#### MERCURY COMPOUNDS

The inorganic mercury compounds have an antiseptic action. Their activity depends on the release of the "mercuric" ion which has an affinity for protein and precipitates it. This action is not selective for bacterial protoplasm so these compounds are very irritating to tissue, have poor penetrating power, and lose much of their germicidal power in the presence of a large amount of protein. They are very toxic after absorption. The ones which ionize most completely, corrode metal and cannot be used for disinfecting in-

struments. Spores are resistant to mercury compounds.

Toxicology.—Acute poisoning usually results from oral ingestion of some highly ionizable salt like mercury bichloride. Early in the poisoning, the mouth and pharynx become ashen gray. There is severe epigastric pain, a metallic taste in the mouth, and vomiting which helps to rid the stomach of the poison. If allowed to remain in the stomach, the mercury salt is absorbed and systemic reactions occur. If the poison reaches the intestines, there is severe irritation resulting in profuse bloody diarrhea which may cause shock and death.

The patient usually recovers from the local symptoms if vomiting has been sufficient and chemical antidotes have been administered. Systemic reactions may occur in a few hours and last for several days, finally causing death. The pulse is irregular and faint, respiration shallow, skin cold and clammy, features pinched, saliva metallic in taste and excessive in secretion, breath foul, gums sore, and the gum line colored blue. Later the teeth become loose. Severe diarrhea may cause acidosis, and widespread capillary damage may cause shock. Kidney damage is usually the cause of death.

Treatment.—Treatment in acute poisoning is as follows:

- 1. Emetic or gastric lavage.
- 2. Use of the chemical antiodote sodium formaldehyde sulfoxylate is recommended. The stomach is washed with 250 ml. of a 5 percent solution, and another 250 ml. is allowed to remain in the stomach.
- 3. Other antidotes are albuminous drinks, milk, and egg-white.
- 4. Immediate lavage must follow to prevent absorption of the mercury albuminate formed.
- 5. Symptomatic treatment to relieve pain, maintain normal composition of body fluids, and treat shock and acidosis.
- 6. Dimercaprol (BAL) is very useful in treating heavy metal poisoning (see Toxicology, Mercury Poisoning and Antidote, this chapter, for dosage).

Chronic poisoning is usually the result of exposure to inorganic mercury compounds over an extended period of time. The symptoms are stomatitis, colitis, progressive kidney damage, loss of appetite, nutritional disturbances, anemia, men-

tal depression, and insomnia. The treatment consists of removal of the source of poisoning and symptomatic treatment. The response is slow and the illness may last for several years.

## Mercury (Quicksilver)

Action and Use.—Metallic mercury in bulk is not absorbable, but in a finely divided state it is taken up from the intestinal tract. It is probably absorbed as an albuminate or oxide and produces its effect as the mercuric ion. Its elimination is rather slow, giving it a cumulative action. It has an inhibitive action on the *Treponema pallidum*. At one time strong mercurial ointment was used in the form of "mercury rubs" for the treatment of syphilis. Mass of mercury is also an antiluetic. Mild mercurial ointment is used in the treatment of infestation with lice.

# Mercury Bichloride (Corrosive Sublimate, Mercuric Chloride)

Action and Use.—Mercury bichloride is commonly used as a disinfectant for inanimate objects. A 1:1,000 solution is used to sterilize certain surgical instruments which cannot be boiled. IT IS EXTREMELY POISONOUS. It is marketed in the form of the official Mercury Bichloride Large Poison Tablets or Small Poison Tablets. These must conform to the official requirements: (1) the shape must be angular and not discoid; (2) the color must be anything but white; (3) they must be packaged in containers having an angular shape with roughened edges; and (4) the containers must bear the word POISON on the label and state the quantity of mercury bichloride in each tablet.

CAUTION: Mercury bichloride deteriorates rubber gloves and may corrode surgical instruments.

## Yellow Mercuric Oxide (Yellow Precipitate)

Action and Use.—Yellow mercuric oxide is used in ointment form as an antiseptic in the treatment of eye infections, also in certain skin infections where antibiotics cannot be employed due to sensitivity.

Dose Usual: Topical, as 1% ointment

#### Ammoniated Mercury (White Precipitate)

Action and Use.—The ointment form is used in the treatment of parasitic skin diseases such as

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fungus infections and impetigo. Care must be taken not to rub it into the skin too vigorously, as it may produce dermatitis or be absorbed with undesirable effects.	
Dose Recommended: Topical, as 5% ointment as parasiticide (White Precipitate Ointment); as 3% ophthalmic ointment	
Merbromin (Mercurochrome®)	
Action and Use.—Merbromin is not an active	
germicide but it does inhibit bacterial growth. It is nonirritating to the tissue but does not penetrate living tissue readily, and its bactericidal activity is greatly reduced by organic matter.  It is used as a mild antiseptic for minor cuts,	
in surgery to wash out internal cavities, and to prepare the skin for operation.	
Dose Usual: Topical, as mild antiseptic 2% solution; as surgical preparation 2% solution	
Nitromersol (Metaphen®)	$\Pi$
Action and Use.—Nitromersol is used only in	10
the form of the sodium salt as a topical antiseptic and to disinfect the skin and surgical instruments. It is not very effective against sporulating organisms.	
Dose Usual: Topical, as 0.2% solution (Metaphen Solution); as 0.5% tincture (Metaphen Tincture)	
Thimerosal (Sodium Ethylmercurithiosalicylate, Merthiolate®)	
Action and Use.—Thimerosal is a bacteriostatic for many nonsporulating bacteria. It is also a fungicide. It is used in the form of a tincture	
on intact skin; in the form of an aqueous solution for wounds, ophthalmologic use and application to mucous membranes as an antiseptic. The oint- ment and jelly are used as antiseptics.	
Dose Usual: Topical tineture (intact skin) 1: 1,000 Actions solutions (wounds) 1:1 000	
Aqueous solutions (wounds) 1:1,000 Ophthalmologic use, 1:5,000 to 1: 10,000	
Nasal mucous membranes, 1:5,000 to 1: 30,000	

#### MISCELLANEOUS ANTISEPTICS

Boric Acid

Action and Use.—Boric acid is obtained from borax by treating it with hot solutions of hydrochloric or sulfuric acid. When boric acid is mixed with salicylic acid, the combination acts as an alkaloidal precipitant. Boric acid is a weak antiseptic. Aqueous solutions inhibit bacterial growth. They are nonirritating and therefore suitable for application to delicate structures. In aqueous solution, boric acid is used as an antiseptic irrigation for the eyes, nasal passages, mouth and bladder. The ointment, dusting powder, and solutions are employed in the treatment of skin diseases, bed sores, and similar conditions.

Toxicology.—Oral ingestion of boric acid may cause nausea, vomiting, abdominal pain, diarrhea, headache, weakness, visual disturbances, renal injury and possible collapse.

Treatment.—The treatment is symptomatic.

Dose Usual: Topical, as 10% ointment; as 5% ophthalmic solution.

Salicylic Acid and

Benzoic Acid (Flowers of Benzoin)

Action and Use.—Salicylic acid is too irritating to be taken internally. It is used locally for the removal of corns and warts and in the treatment of skin diseases like athlete's foot and eczema. It is prescribed in the form of lotion, collodion, ointment, and dusting powder.

Benzoic acid is used in the manufacture of sodium benzoate, a valuable food preservative; about 0.1 percent of sodium benzoate being sufficient for canned foods, syrups and similar preparations.

Benzoic acid is an active bactericide and fungicide. When combined with salicylic acid, it is widely used in treatment of fungus infections of the feet. This ointment is called Whitfield's Ointment.

Dose Usual: Topical, as ointment 6% benzoic and 3% salicylic acid

Methylparaben (Methyl Parasept)

Propylparaben (Propyl Parasept)

Action and Use.—In the preservation of medicinal preparations, these two parabens are usually

employed. Methylparaben is antiseptic; propylparaben is bacteriostatic. A combination of the methyl and propyl parabens has a synergistic effect.

Usual Strength: Methylparaben 0.05 to 0.25% and propylparaben 0.02 to 0.2%.

Formaldehyde Solution (Formalin)

Action and Use.—Formaldehyde is an irritant and general protoplasmic poison. In high concentrations it precipitates protein, and even in low concentrations it is toxic to cells. In proper concentrations, it is an effective germicide against all forms of organisms. It is used as a disinfectant for inanimate objects. Well diluted, it is employed as an irrigant in the treatment of vaginal infections, fungus infections of the skin, and poison ivy. Because of its astringent action, it is sometimes used in about 20 percent solution to check excessive sweating.

Toxicology.—Symptoms may be noted after exposure to formaldehyde gas. These include intense irritation of the eyes and respiratory tract and result in conjunctivitis, coryza, bronchitis, and even pneumonia. If taken by mouth, there is irritation of the mouth, throat, and gastrointestinal tract, with severe pain, vomiting, and diarrhea. It depresses the central nervous system and may cause symptoms similar to alcohol intoxication such as vertigo, depression, and coma. Convulsions occur rarely. Severe acidosis may result from the formation of formic acid. The urine is scant, containing red cells and casts.

Treatment.—Treatment following ingestion of formaldehyde is as follows:

- 1. Gastric lavage.
- 2. Use of demulcents.
- 3. Symptomatic treatment.

Usual Strength: As solution, 37%

Methenamine (Hexamethylenetetramine, methylenamine, Formin, Urotropin®)

Action and Use.—Methenamine is a weak antiseptic. When taken internally, it is circulated through the body fluids unchanged and is rapidly excreted in the urine. In acid urine, formaldehyde is released with an antiseptic effect. Since urinary antiseptics act best in an acid medium, methenamine is usually prescribed with a urine acidifier

such as ammonium chloride or sodium biphosphate.

Dose Usual: Oral, 0.5 gram (7½ grains)

Methenamine Mandelate (Mandelamine®)

Action and Use.—Methenamine mandelate combines the therapeutic properties of methenamine and mandelic acid. This is a useful drug in the treatment of cystitis, pyelitis, and infections of the bladder. It is bactericidal and bacteriostatic in action and might be compared to the sulfonamide drugs in this regard. This drug may be given over long periods of time. There are very few side effects.

Dose Usual: Oral, 1 gram up to 4 times a day Dose Range: 250 mg. to 1 gram

Nitrofurantoin (Furadantin®)

Action and Use.—Nitrofurantoin is administered orally for the treatment of bacterial infections of the urinary tract, cystitis and pyelitis. It causes few side effects such as nausea or vomiting. This drug is not indicated if severe kidney damage is present. The urine may turn brown when this drug is administered.

Dose Recommended: Oral, 5 to 8 mg. per kg. of body weight daily, given in divided doses

#### MEDICINAL DYES

The medicinal dyes are employed as antiseptics, chemotherapeutic agents against protozoa, wound-healing agents, and diagnostic agents for the determination of renal and hepatic functions. They may be classified chemically as azo, acridine, fluorescein, phenolphthalein, rosaniline and miscellaneous dyes.

#### Azo Dyes

Scarlet Red (Scarlet Red Medicinal, Biebrich Scarlet Red)

Action and Use.—The azo dyes are used as wound healing agents. They stimulate proliferation of epithelial cells and are used in the treatment of wounds, burns, ulcers, and bedsores. They are usually applied in the form of an ointment or emulsion.

Dose Usual: As ointment, 5.0% scarlet red

#### Acridine Dyes

Acriflavine (Neutral Acriflavine, Acriflavine Base)

Action and Use.—The acridine dyes are yellow dyes. Their derivatives are not irritating or toxic

to tissue and possess marked antiseptic and germicidal properties.

Acriflavine is used in treatment of wounds, inflammations of the gums, throat infections, urethritis, and otitis media. It is applied as an ointment or in solution by wet dressings or irrigation. Acriflavine is sometimes given orally as a urinary antiseptic. The urine should be alkaline to permit its action. Solutions of acriflavine are not stable and should be discarded within one week after preparation. They are affected by light and should be stored in amber-colored bottles.

Dose Usual: Topical, 1: 1,000 solution

## Rosaniline Dyes

Methylrosaniline Chloride (Gentian Violet, Methyl Violet, Crystal Violet)

Action and Use.—These dyes are weak bactericides, but they are effective against gram-positive bacteria. They are used as antiseptics for infected wounds, mucous membranes and serous surfaces, and for the treatment of fungus infections of the skin. The rosaniline dyes used in medicine are gentian violet, brilliant green and basic fuchsin.

Methylrosaniline chloride is commonly used as an anthelmintic and anti-infective.

Dose Usual: Oral, 60 mg. 3 times a day for 1 or 2 weeks

Topical, as a 1% solution

Dose Range: Oral, 10 to 60 mg.

#### Miscellaneous Dyes

Methylthionine Chloride (Methylene Blue)

Action and Use.—Solutions of this dye have a deep blue color. It is a weak bactericide and is more efficient as a bacteriostat. In low concentrations it inhibits the growth of the *Mycobacterium tuberculosis*. In an 1:1,000 solution it is bactericidal against micrococci (staphylococci). It was formerly used as a urinary antiseptic but has been largely replaced by more effective drugs. It is employed in a 1 percent solution in the treatment of *Trichomonas vaginalis* vaginitis.

Methylthionine chloride has two opposite actions on the hemoglobin. In high concentrations it converts hemoglobin into methemoglobin, while in low concentrations it hastens the conversion of methemoglobin back to hemoglobin. Adminis-

tered orally in capsules or tablets, it inhibits the growth of intestinal protozoa.

Dose Usual: 0.15 gram (2½ grains)

# CENTRAL NERVOUS SYSTEM DEPRESSANTS

#### BARBITURATES

The barbiturates are a widely used group of central nervous system depressants. They all have the same general action, differing in rapidity, degree, and duration. Their effects range from mild sedation to deep coma. They also produce respiratory depression. Large doses may cause vasodilation accompanied by a fall in blood pressure, injure the liver, and have an anti-diuretic effect. With the exception of phenobarbitol and barbitol, bartiburates are detoxified by the liver and excreted by the kidney. In some cases they are habit-forming.

Barbiturates are used as hypnotics and sedatives, as anticonvulsants, as anesthetics for short or basal anesthesia, and in combination with analgesics to increase their effects. They are administered orally, rectally, subcutaneously, or

intravenously.

Toxicology.—Poisoning by barbiturates is a common occurence both by accident and with suicidal intent. Poisoning is characterized by deep sleep or coma; slow respiration; weak, rapid pulse; a fall in body temperature; and moist, cold, cyanotic skin. The capillaries may dilate and in the later stages shock may ensue. Death occurs from respiratory failure.

Treatment.—If the barbiturate was taken orally—

1. Gastric lavage should be used, or emetics employed if feasible.

2. Followed by magnesium sulfate to act as a

cathartic.

3. Physiologic antidotes such as picrotoxin, Metrazol (brand of pentylenetetrazol), caffeine, ephedrine, or Coramine (brand of nikethamide) should be given to counteract the depressant effects on the respiration and central nervous system.

4. The patient should be treated symptomati-

cally.

Barbiturates are cumulative poisons and are capable of causing chronic poisoning, with symp-

toms of drowsiness, failing memory, mental depression, incoherent speech, and disorientation. There may also be various nervous and gastro-intestinal disorders, skin rashes, pruritis, loss of weight, and casts and albumin in the urine. The treatment consists of stopping the drug, hospitalization of the patient, and symptomatic treatment.

# Amobarbital (Amytal®)

Action and Use.—Amobarbital is a moderateacting barbiturate.

Dose Usual: 100 mg. once or twice daily

Dose Range: 20 to 300 mg.

## Amobarbital Sodium

Action and Use.—Same as amobarbital. Because of its solubility it may be administered intramuscularly or subcutaneously, as well as orally.

Dose Usual: I.M., subcutaneous, 100 mg. once or twice daily

Dose Range: 20 to 500 mg.

# Aprobarbital Tablets (Alurate®)

Action and Use.—Aprobarbital is similar to amobarbital, but is more potent and has an action of shorter duration.

Dose Usual: 60 mg.

## Barbital (Veronal®)

Action and Use.—Barbital is a slow-acting barbiturate and should be administered about 2 hours before the time sleep is desired. Its length of action is long. It is used as a hypnotic, sedative, and anticonvulsant.

Dose Usual: 0.3 gram (5 grains)

# Phenobarbital (Luminal®)

Action and Use.—Phenobarbital acts slowly. It is more powerful than barbital, but its uses are similar.

Dose Usual: 30 mg. (½ grain) up to 4 times a

As tablets, 30 mg. (½ grain)

As elixir, 5 ml. (20 mg. of phenobarbital)

Dose Range: 15 to 100 mg.

As elixir, 5 to 15 ml.

Phenobarbital Sodium (Luminal Sodium®)

Action and Use.—Same as phenobarbital. Because of its solubility it may be administered hypodermically.

Dose Usual: Oral and parenteral, 30 mg. up to 4 times a day

Dose Range: 15 to 100 mg.

Pentobarbital Sodium (Nembutal Sodium®)

Action and Use. - Pentobarbital sodium acts rapidly and has the same uses as the other barbiturates.

Dose Usual: Oral, 100 mg. once or twice a day

I.V., 200 mg.

Dose Range: Oral, 100 to 500 mg.

I.V., 100 to 300 mg.

Secobarbital Sodium (Seconal Sodium®)

Action and Use. - Secobarbital sodium is a shortacting barbiturate and has the same uses as the other barbiturates.

Dose Usual: Oral, 100 mg. up to 3 times a day Dose Range: 50 to 100 mg.

Thiopental Sodium (Thiopentone Soluble, Pentothal Sodium®)

Action and Use.—Thiopental sodium acts quickly and is used intravenously for anesthesia in operations of short duration. It should be injected slowly by an experienced person. It is sometimes used to control convulsions in strychnine poisoning. For parenteral use, the sterile thiopental sodium should be used, mixed with anhydrous sodium carbonate as a buffer. It is considered to be an ultra-short acting barbiturate.

Dose Usual: I.V., 2 to 3 ml. of 2.5% solution in 10 to 15 seconds, repeated in about 30 seconds as required

#### **BROMIDES**

The bromide ion is a depressant to nerve tissue, but it shows a selective action for the spinal cord. Small doses affect the motor area of the cerebrum; larger doses cause depression of the sensory side of the spinal cord; very large doses cause some mental confusion.

Bromides are used:

1. As sedatives to relieve nervousness and encourage sleep. They are not true somnifacients but induce sleep by lessening perception of sense stimuli.

2. As anticonvulsants, particularly in epileptic seizures. They may be used in tetanic convulsions, but their action is rather slow for this purpose.

3. As sedatives to allay pain, control seasickness, vomiting in pregnancy, and to lessen sexual

hyperesthesia.

Toxicology.—Excessive use may produce symptoms of chronic poisoning, known as bromism. The characteristic symptoms are an acne-like eruption of the skin, fetid breath, occasional mental confusion, and muscular weakness.

Treatment.—The treatment consists of complete withdrawal of the drug, large doses of sodium chloride, and symptomatic treatment.

## Sodium Bromide

Action and Use. - Sodium bromide has a variety of uses as a sedative and mild hypnotic. Except where sodium is contraindicated, sodium bromide is to be preferred over the other bromide salts and preparations because it is inexpensive and less irritating to the stomach.

Dose Usual: 300 mg. 3 times a day Dose Range: 300 mg. to 1 gram

#### Potassium Bromide

Action and Use.—Potassium bromide is one of several bromide salts employed when the action of the bromide ion is desired. For this purpose, the sodium rather than the potassium salt is indicated (see above).

Dose Usual: 1 gram

#### Three Bromides Elixir

Action and Use.—This elixir, a combination of sodium, potassium, ammonium bromides, is employed for the sedative action of the bromide ion. It has no advantages over sodium bromide.

Dose Usual: 4 ml. (1 fluidram)

#### MISCELLANEOUS DEPRESSANTS

Diphenylhydantoin Sodium (Soluble Phenytoin, Dilantin Sodium®)

Action and Use.—Diphenylhydantoin sodium is used as an anticonvulsant in treatment of epilepsy and is preferred to phenobarbital because it has no hypnotic properties. Occasionally it is combined with phenobarbital to increase its action. It is more effective in the grand mal type seizures.

Side Effects.—Diphenylhydantoin sodium sometime produces toxic symptoms such as giddiness, ataxia, nervousness, visual disturbances, slurring of speech, confusion, headache, dyspnea, difficulty in swallowing, acute gastric disturbance, dermatitis, and hyperplasia of the gums. These symptoms are not serious and usually subside upon withdrawal of the drug.

Dose Usual: 100 mg. up to 4 times a day Dose Range: 100 to 600 mg.

# Trimethadione (Tridione®)

Action and Use.—Trimethadione is an antiepileptic drug which acts as an anticonvulsant. It is used primarily in petit mal seizures and is not effective in grand mal seizures. Gastric irritation, nausea, and blurring of vision are toxic symptoms.

CAUTION: Complete blood examination should be done before prescribing this drug. It should not be administered in the presence of anemia, leukopenia, thrombocytopenia, or hepatic disease.

Dose Usual: 300 mg. 3 to 6 times a day Dose Range: Up to 300 mg.

# Parmethadione (Paradione®)

Action and Use.—The action and uses of this drug are similar to trimethadione. It has less toxic effects.

Dose Recommended: Initial dose: 0.3 gram (5 grains) 3 times a day after which dosage may be increased or decreased to control symptoms

# Mephobarbital (Mebaral®)

Action and Use.—This is a barbituric acid derivative employed mainly in the treatment of epileptic seizures.

Dose Usual: Oral, 30 mg.

#### Chloral Hydrate (Chloral)

Action and Use.—Chloral hydrate is used as a sedative and hypnotic. In therapeutic doses it causes sedation in 10 to 15 minutes and sleep within an hour.

Toxicology.—The symptoms are deep stupor, marked vasodilation, low blood pressure, fall in body temperature, slow respiration, and cyanosis;

occasionally there is delirium or collapse. Gastric irritation may be followed by vomiting. Death results from respiratory failure.

Treatment.—Treatment should consist of the following:

1. Gastric lavage.

2. The patient should be kept warm and all efforts should be made to keep him awake. However, those measures which throw an added strain upon the heart, such as walking, should be avoided.

3. Stimulants as prescribed for barbiturate

poisoning.

Dose Usual: 600 mg. up to 3 times a day Dose Range: 250 mg. to 1 gram

## Chlorobutanol (Chloretone)

Action and Use.—Chlorobutanol is used as a hypnotic and sedative. It is given orally to allay vomiting due to gastritis. It is also somewhat effective in the treatment of motion sickness. Frequently it is used in the form of a dusting powder or ointment for its local anesthetic effect. Sometimes it is employed as a preservative in solutions of epinephrine, posterior pituitary, and other drugs.

Dose Recommended: 0.6 grams (10 grains)

## Paraldehyde

Action and Use.—The action of paraldehyde is similar to that of chloral hydrate. It is a hypnotic and sedative and produces normal sleep, without after effects, in from 10 to 15 minutes. Its hypnotic effects are not as potent as those of chloral hydrate, and large doses do not depress respiration.

Paraldehyde has a wide margin of safety, and although excessive doses may cause prolonged unconsciousness, fatalities are rare. The drug should be administered well diluted in a proper vehicle to avoid throat and gastric irritation.

CAUTION: Paraldehyde occasionally decomposes into acetic acid which is dangerous. Every container should be carefully examined for evidence of decomposition.

Dose Usual: Oral and rectal, 4 ml. up to 3 times a day

Dose Range: 1 to 30 ml.

### Alcohol (Ethyl Alcohol)

Action and Use.—Alcohol is a product of fermentation of sucrose by certain yeast enzymes.

It may be prepared synthetically. Locally, alcohol injures the tissue cells by precipitating protein. It is irritating to open cuts and mucosa; applied to the skin it evaporates with a cooling effect; applied by rubbing it produces a mild redness and burning; injected hypodermically it causes local anesthesia. Systemically, alcohol is narcotic in action. Although in small doses it stimulates the gastric mucosa, increasing the flow of juices, its effect on the central nervous system is progressively depressing. The respiration and heart are slightly affected by a small dose, but continuous small doses produce hypnotic effects. Alcohol causes vasodilation resulting in a warm, flushed skin and a feeling of surface warmth, but it lowers the body temperature. When large amounts are ingested, the fall in temperature is very pronounced. High concentrations of alcohol injure the kidney epithelium.

Alcohol is a hydrocarbon and is oxidized in the body, yielding energy, so it may be considered a food. It cannot be stored or utilized to build tissue, but by yielding energy it lessens consumption of other foodstuffs and, therefore, chronic alcoholics show signs of malnutrition.

Alcohol may be used locally—

1. As a sponge bath in fevers.

2. As a rubefacient and counterirritant.

3. As a local anesthetic, injected in or near the nerves to allay pain, as in spasmodic facial neuralgia or sciatica.

4. As an antiseptic, applied externally in 70 percent strength.

Systemically it may be used—

- 1. In treatment of insomnia in the form of whiskey, brandy, or wine.
  - 2. As a digestive stimulant.
  - 3. As a hypnotic.

Toxicology.—Acute alcohol intoxication. The symptoms are stupor or coma, cold clammy skin, low body temperature, slow respiration, normal or dilated pupils, accelerated heart rate. Death is rare, unless coma persists for more than 12 hours.

Treatment.—Treatment for acute alcohol intoxication is as follows:

- 1. Gastric lavage.
- 2. Warmth.
- 3. Respiratory stimulants such as caffeine and sodium benzoate, 0.5 gram I.M., or enemas of strong coffee.
  - 4. Symptomatic measures.

Toxicology.—Chronic alcoholism. The symptoms vary and include gastroenteritis; dilation of the skin capillaries, particularly those of the face; loss of weight; malnutrition; personality changes; delirium tremens; mental and moral deterioration; alcoholic cirrhosis; pellagra; and serious organic disorders.

Treatment.—The patient should be hospitalized for treatment.

## OPIUM AND ITS ALKALOIDS

Morphine and codeine are the most important of the alkaloids of opium. Opium is a narcotic, depressing cerebral activity and producing analgesia and sleep. It is a respiratory depressant. Small doses dull the cough reflex and larger doses abolish it. It often relieves dyspnea. This drug stimulates the spinal cord and the medullary vomiting center and is therefore never used as a sedative in strychnine poisoning or other convulsive states. It constricts the pupils. It causes constipation by diminishing the secretions of the gastrointestinal tract and increasing the tone of the intestinal musculature to the point of spasm. Morphine stimulates other smooth muscles to contraction. It has little effect on the cardiovascular system, but the therapeutic amounts of morphine relax the cutaneous blood vessels, causing flushing, itching, sweating, and sneezing. Opium is less depressant to respiration than morphine because of the stimulating effect of narcotine and papaverine. It is more constipating than morphine, probably because of the depressant effect of papaverine on the smooth muscles of the intestines. It is more likely to cause nausea because of its irritant action on the gastric mucosa.

Opiates are used—

- 1. As analgesics. For this purpose, morphine is preferred to the whole drug.
  - 2. As cough sedatives in bronchitis.
  - 3. As diaphoretics.
  - 4. As hypnotics.
- 5. As treatment for certain types of diarrhea (preparations of the whole drug being preferred to morphine), and vomiting of *reflex* origin.

Toxicology.—The symptoms are deep sleep or coma, depressed respiration, pupils symmetrical and contracted, cyanosis, suppressed urine, low body temperature, and cold, clammy skin. The

blood pressure may fall to shock level. There may be skin rashes and pruritis. Before depression, the patient may become restless and delirious and vomiting may occur. Death is usually due to respiratory failure.

Treatment.—Treatment for toxicity is as follows:

1. Gastric lavage with potassium permanganate (1:1000 solution). At its conclusion add 100 ml. of a mixture of 50 percent magnesium sulfate and "Universal Antidote."

2. Magnesium sulfate solution should be left in the stomach after lavage to act as a cathartic.

3. Nalorphine hydrochloride 5 to 40 mg.

parenterally.

- 4. Respiratory stimulants such as caffeine, ephedrine, coramine, or atropine may be used. Strychnine or picrotoxin, however, should not be used.
- 5. If respiration fails in spite of these measures, artificial respiration must be used and continued as long as the heart beats.

6. The kidneys should be kept functioning as they are the main agent of elimination of the poison.

7. The patient should be kept awake and moving if possible.

8. Treat symptomatically.

NOTE: All drugs listed in this section are regulated by the Harrison Narcotic Law. Opium and morphine are drugs of addiction. This addiction is extremely difficult to overcome and produces serious effects on the physical and moral condition of its victims. Their sale is strictly regulated in the United States and most other countries.

## Camphorated Opium Tincture (Paregoric)

Action and Use.—This preparation must not be confused with opium tincture which is considerably stronger. It is employed mainly as an intestinal sedative.

Dose Usual: 4 ml. 4 times a day

Dose Range: 4 to 10 ml.

Ipecac and Opium Powder (Dover's powder)

Action and Use.—This preparation was once very popular, but it has fallen somewhat into disuse. It produces sweating and relieves aches and discomforts of colds, and so forth.

Dose Usual: 0.3 gram (5 grains)

Morphine Sulfate

Action and Use. - Morphine sulfate is more largely prescribed in the United States than any other salt of morphine. (See uses under Opium above.)

Dose Usual: Oral and subcutaneous, 15 mg. (1/4 grain) every 4 hours as needed.

Dose Range: 8 to 20 mg.

## Morphine and Atropine Sulfate Tablets

Action and Use.—Atropine is given with morphine to offset respiratory depression and other undesirable effects. It is valuable in checking secretions.

Dose Usual: Morphine sulfate 15 mg. (4 grain); atropine sulfate 0.4 mg. (1/150 grain)

#### Codeine Sulfate

Action and Use.—Codeine resembles morphine in action but has about one-sixth of the analgesic power and about one-fourth of the respiratory depressant effect of morphine. It has the same therapeutic uses. It is not habit-forming and is It is very useful in depressing less constipating. the cough reflex.

Dose Usual: 30 mg.

Ethylmorphine Hydrochloride (Dionin®)

Action and Use.—This drug is prepared synthetically from morphine. It has more analgesic and hypnotic power than codeine but less than morphine.

It is used as a cough sedative and analgesic, and as a lymphagogue in various inflammations of the eve and nose because of its irritating effect on the mucous membrane.

Dose Usual: Oral, 15 mg. (4 grain) Topical, as ophthalmic solution, 1 to 5% solution

Dihydromorphinone Hydrochloride (Dilaudid Hydrochloride®)

Action and Use.—The action of dihydromorphinone hydrochloride is similar to that of morphine, but it is about 10 times more anlagesic and 5 times more hypnotic. It causes less nausea, vomiting, and constipation than morphine. It is used as an analgesic and cough sedative.

Dose Usual: Oral and subcutaneous, 2 mg. every 4 hours as needed

Dose Range: Oral and subcutaneous, 1 to 4 mg.

Meperidine Hydrochloride (Demerol Hydrochloride®)

Action and Use.—Meperidine hydrochloride is prepared synthetically. Chemically, it is not closely related to the opium alkaloids. Its action is similar to a combination of morphine and atropine although milder than that of morphine.

Dose Usual: Oral and parenteral, 100 mg. every 4 hours as needed

Dose Range: 25 to 100 mg.

 $\begin{array}{c} \text{Methadone Hydrochloride (Dolophine } \quad Hydrochloride^{\textcircled{\$}}) \end{array}$ 

Action and Use.—This drug is prepared synthetically and is similar to morphine in action although it is somewhat more analgesic. The onset of action is slower than morphine. It is used for relief of pain, and for depressing the cough center. In general, it depresses respiration less than morphine. It may cause addiction.

Dose Usual: Oral and subcutaneous, 7.5 mg· every 4 hours as needed

Dose Range: 5 to 10 mg.

## Metopon Hydrochloride

Action and Use.—Metopon hydrochloride is a derivative of morphine. Its analgesic properties are greater than those of morphine and has fewer side effects. It is used to relieve severe pain such as that caused by cancer. This drug like morphine may cause addiction.

Dose Recommended: Oral, 3 mg. as needed.

#### Pantopon

Action and Use.—Pantopon is a mixture of purified alkaloids of opium in a concentrated form possessing the analgesic properties of opium. It can be used orally or parenterally.

Dose Recommended: 20 mg. (1/4 grain)

#### Papaverine Hydrochloride

Action and Use.—Papaverine differs from other official opium alkaloids in that it produces very little effect on the central nervous system. In therapeutic doses it does not cause analgesia or sleep. It relaxes many smooth muscles, particularly those of the blood vessels, bronchi, gastrointestinal tract, ureter, and biliary system.

Papaverine is used in the treatment of peripheral or pulmonary arterial embolism, in threat-

ened gangrene, and in certain other forms of peripheral vascular disease. It is also used to relax spasms of the bronchi or the gastrointestinal and genitourinary tracts.

It is also available in sterile solution in water for injection.

Dose Recommended: Oral, 0.2 grams (3 grains) Dose Usual: Injection, I.M. and I.V., 30 mg. Dose Range: 30 to 60 mg.

Nalorphine Hydrochloride (Nalline Hydrochloride®)

Action and Use.—Nalorphine is derived from morphine and due to its respiratory stimulant properties is a specific antidote for morphine and its derivatives meperidine and methadone. It reverses respiratory depression due to these drugs and will also prevent depression if given before morphine is used. It is of no value in the treatment of respiratory depression caused by barbiturates.

Dose Usual: Parenteral, 5 mg. Dose Range: 5 to 40 mg.

#### SKELETAL MUSCLE RELAXANTS

These skeletal muscle relaxants are used to produce muscular relaxation during surgical anesthesia and are used in connection with the treatment of muscle spasms due to various conditions.

Tubocurarine Chloride (d-Tubocurarine Chloride)

Action and Use.—Tubocurarine chloride in small doses blocks the transmission of nerve impulses to skeletal muscle. Larger doses depress ganglionic transmissions in the autonomic nervous system. It is used in a number of conditions to reduce the tone of contractile skeletal muscle. It is used as an adjunct to anesthetic agents which do not bring about adequate muscular relaxation, in spastic conditions, in conjunction with shock therapy to reduce convulsions, and as a diagnostic aid in myasthenia gravis.

NOTE: This is a very potent drug and may cause respiratory failure. It must be administered by highly trained individuals.

Dose Usual: I.V., 6 to 9 mg. followed in 5 minutes by 3 to 5 mg. as needed

Succinylcholine Chloride (Anectine Chloride®)

Action and Use.—This drug is similar in action to tubocurarine and is of shorter duration. It is

used to produce skeletal muscle relaxation during anesthesia and endotracheal intubation, and so forth.

CAUTION: This drug may cause severe respiratory depression. It is to be administered only by highly trained individuals.

Dose Usual: I.V., 20 mg. Dose Range: 10 to 40 mg.

### Mephenesin (Tolserol)

Action and Use.—This drug relaxes muscles in certain spastic disorders such as cerebral palsy and is of value in bursitis and spondylitis. It relieves symptoms of tremors in diseases such as acute alcoholism. It is useful in muscular spasms of the back. Common side effects are weakness, nausea, vomiting, and muscular incoordination.

Dose Usual: Oral, 1 to 3 grams, 3 to 5 times a day I.V., 30 to 150 ml. of a 2% solution

# Zoxazolamine (Flexin®)

Action and Use.—Zoxazolamine is a skeletal muscle relaxant. Like mephenesin it acts on the brain stem, subcortical areas, and the spinal cord. It does not act directly on skeletal muscle. This drug is used for such musculoskeletal disorders as sprains, contusions, muscle strains, back disorders, bursitis, myositis and spondylitis. It affords prompt relief from muscle-spasm discomfort. It is of little value in rheumatoid arthritis. This drug has a wider margin of safety than has mephenesin.

Side Effects.—The most frequent side effects are nausea, vomiting, headache, skin rash, weakness and drowsiness.

Dose Recommended: 250 to 500 mg., 3 to 4 times a day during meals

#### TRANQUILIZING DRUGS

This is a new class of drugs. They have been described, in addition to tranquilizing, as ataraxic, calmative, and neurosedative. Tranquilizers allay anxiety and are used to treat mental and emotional disturbances. They generally possess muscle relaxant and antiemetic properties.

# Meprobamate (Equanil®, Miltown®)

Action and Use.—Meprobamate is an antianxiety drug with muscle relaxant properties. It acts on the central nervous system but has no effect

on respiration, heart action, or other autonomic functions.

Dose Recommended: Oral, 400 mg. 3 times daily and at bedtime, if desired

## Chlorpromazine Hydrochloride (Thorazine®)

Action and Use.—This drug is used in the treatment of nausea, vomiting, mental and emotional disturbances. Its widest use is in alleviating manifestations of anxiety, tension, and agitation. It is also used in conjunction with surgical and obstetrical cases and in intractable pain. Dosage is highly individualized depending on severity of symptoms and degree of response.

Side Effects.—Chlorpromazine produces a number of side effects and toxic reactions, some of which may be serious. Cases of fatal blood

dyscrasias have been reported.

CAUTION: This drug should not be used in comatose states of central nervous system depression due to barbiturates, opiates, alcohol, among others, and in patients intoxicated by large amounts of barbiturates or narcotics.

Dose Recommended: 25 to 50 mg.

## Promazine Hydrochloride (Sparine®)

Action and Use.—Promazine is used for management of the acutely disturbed patient and has a similar action to chlorpromazine. It allays symptoms of acute hyperactivity and inhibits maniacal impulses through a tranquilizing and calming action. Promazine causes little or no fall in blood pressure or undue mental depression.

CAUTION: Use with caution in comatose states due to central nervous system depressants.

Dose Recommended: 25 to 50 mg.

Reserpine (Serpasil®, Sandril®, Reserpoid®)

Action and Use.—Reserpine is a widely used tranquilizing and antihypertensive agent. It is employed in combination with hydrazaline hydrochloride (Apresoline) and other drugs in treatment of hypertension.

Dose Recommended: Oral, 0.5 mg. daily for hypertension, anxiety

Dose Range: 0.1 to 0.75 daily

# Hydroxyzine Hydrochloride (Atarax®)

Action and Use.—Hydroxyzine exhibits marked cerebral specificity with central neurorelaxation as

its chief effect. It has a similar action to chlor-promazine. Hydroxyzine elicits no mental fogging or risk of liver, blood, or brain damage.

Dose Recommended: 25 mg. 3 times daily

Hydroxyzine Hydrochloride and Prednisolone  $(Ataraxoid^{\circledast})$ 

Action and Use.—This is an ataractic corticoid combination used to ease mental tension and enhance therapeutic response in treatment of allergic and inflammatory conditions such as rheumatoid arthritis and bronchial asthma.

CAUTION: Prednisolone is a highly potent agent with profound metabolic effects and administration should be closely supervised. Warning signs of overdosage such as edema and facial mooning may be absent.

Dose Recommended: In severe cases, 5 mg. tablets, 4 to 6 times a day In mild cases, 1 mg. tablets, 4 times a day

## Prochlorperazine (Compazine®)

Action and Use.—Prochlorperazine is a compound similar in action and use to those of chlorpromazine, to which it is related chemically, but is more potent. It is mildly antihistaminic and antispasmodic. It is employed for the treatment of mild emotional disturbances such as anxiety, tension, and agitation. This drug alleviates these conditions and lessens motor activity. It is effectively employed as an antiemetic and is five times more potent than chlorpromazine. Prochlorperazine is less toxic than chlorpromazine.

Side Effects.—Side effects are generally mild and include dizziness, hypotension, tinnitis and vertigo. No jaundice or blood dyscrasias have been reported. When high doses are used, spasticity and constriction of skeletal muscles may result.

Dose Recommended: In mild disturbances, 5 to
10 mg. 3 to 4 times a
day
Psychotic patients, 30 to
40 mg. a day in divided

doses.

## Penaglycodol (Ultran®)

Action and Use.—Ultran is used for its mild tranquilizing or relaxing effect in patients with emotional instability, anxiety-tension states and functional disorders. When administered accord-

ing to recommended dosage, it does not impair mental acuity. It is similar in action to meprobamate.

Dose Recommended: Oral, 300 mg. 3 times a day and 600 mg. at bedtime if desired

## Perphenazine (Trilafon®)

Action and Use.—Perphenazine is an extremely potent antianxiety and antiemetic agent which provides a good therapeutic ratio and versatility in clinical use. It is used in treating symptoms of anxiety, tension, psychomotor excitement and other types of mental stress without apparent suppression of mental acuity. Patients requiring intensive therapy should receive careful supervision because of the possibility of side effects which appear more frequently when high doses are used. Significant untoward reactions have been infrequent in patients receiving less than 30 mg. orally per day.

Side Effects.—Among side effects observed have been blurred vision, nasal congestion, constipation, mild hypotensive effects, mild insomnia, motor restlessness and skin rashes. Nausea and vomiting, urinary frequency, and excessive eating appear to be uncommon.

Contraindications.—Comatose or severely depressed conditions resulting from central nervous system depressants contraindicate the use of perphenazine.

Dose Recommended: Oral, 4 mg. 3 or 4 times a day. The dose ordinarily should not exceed 24 mg.

## ANALGESICS AND ANTIPYRETICS

Analgesics are drugs which are used to relieve pain without producing loss of consciousness. Some drugs of this general class were first used as antipyretics and are sometimes called antipyretic analgesics.

### Sodium Salicylate

Action and Use.—The salicylates are antipyretics and analgesics. They lower the temperature rapidly in febrile patients but rarely affect normal body temperature. This is true of most antipyretics. As analgesics, the salicylates are less effective than morphine. Therapeutic doses have no important cardiovascular action. Toxic doses

may depress circulation by vasomotor paralysis. The heart is not affected except in very large doses. Salicylates may irritate the gastrointestinal tract and cause epigastric distress, nausea and vomiting. Therapeutic doses increase the urinary excretion of uric acid.

Salicylates relieve pain in headache, myalgia, arthralgia, and similar conditions. In acute rheumatic fever and gout they reduce the pain, immobility, swelling, and inflammation of the joints.

Toxicology.—The symptoms of mild salicylate poisoning, sometimes called salicylism, are headache, visual and auditory disturbances, dizziness, sweating, thirst, gastrointestinal disturbances, and sometimes skin rashes with excessive itching. Large doses may cause dyspnea. As the poisoning progresses, cardiovascular collapse and respiratory failure may ensue.

Treatment.—The treatment is symptomatic.

Dose Usual: 600 mg. every 2 to 4 hours Dose Range: 300 mg. to 1 gram

Acetylsalicylic Acid (Aspirin)

Action and Use.—This drug has the same uses as mentioned under sodium salicylate. It is sometimes used as a gargle for sore throat. This is one of the safest and most useful analgesic and antipyretic drugs. Sodium bicarbonate helps reduce gastrointestinal irritation.

Dose Usual: 600 mg. every 4 hours as needed (10 grains)

Dose Range: 300 to 900 mg.

#### Colchicine

Action and Use.—Colchicine is used in treatment of gout. In some cases, the pain, swelling, and redness are relieved in a few hours.

Toxicology.—The symptoms of poisoning are excessive nausea, vomiting, abdominal pains, purging, straining, thirst, weak pulse, cold extremities, general prostration, headache, delirium, stupor, muscular depression, and bloody urine.

Treatment.—Treatment for colchicine poisoning

- 1. Gastric lavage.
- 2. Symptomatic therapy.

CAUTION: Colchicine is extremely poisonous.

Dose Usual: 0.5 mg. every ½ to 1 hour for 6 to

8 doses

Dose Range: Up to 0.5 mg.

Ethoheptazine Citrate (Zactane®)

Action and Use.—This is an orally effective, nonaddicting analgesic agent. Unlike most other analgesics it does not produce sedation, suppression of cough reflex, change in pupil size, or constipation. This drug is not intended for use in those types of pain where potent injectable analgesics are required.

Side Effects.—Side effects are infrequent and consist of transient nausea, epigastric distress and dizziness.

Dose Recommended: 75 to 150 mg. 3 to 4 times a day, total daily dosage should not exceed 600 mg.

## Acetophenetidin (Phenacetin)

Action and Use.—Acetophenetidin is similar to sodium salicylate and aspirin. This is an ingredient in APC (proprietary preparation of acetylsalicylic acid, acetophenetidin and caffeine) tablets.

Dose Usual: 300 mg.

Dose Range: 300 mg. to 1 gram

# CENTRAL NERVOUS SYSTEM STIMULANTS

Certain drugs stimulate the activity of various portions of the central nervous system. They differ in site and mechanism of action. They are not employed exclusively as central nervous system stimulants because they have many other actions. The central nervous system can be stimulated only for a brief period as the excitation is soon followed by depression.

#### Strychnine Sulfate

Action and Use.—Strychnine is a powerful stimulant to the central nervous system, particularly the spinal cord and medullary centers. The stimulation of the spinal cord leads to increased activity of the reflexes, and in large doses causes convulsions. Strychnine is a respiratory stimulant and is used as an antidote in poisoning by central nervous system depressants such as the

hypnotics. It is also used as a stomachic and bitter. However, it has limited therapeutic uses and is of interest chiefly from the toxicologic point of view.

Toxicology.—The first symptom of strychnine poisoning is a feeling of stiffness in the face and neck muscles, followed by an increased reflex activity, the smallest stimulus causing a violent response leading to a convulsion. The body becomes rigid, with the trunk arched backward, the arms flexed, the legs extended, the jaw closed, and the facial muscles drawn into a sardonic grin. Spasm of the abdominal and thoracic muscles is accompanied by arrest of respiration. The eves bulge, the pupils contract and cyanosis is present. The patient is conscious and in pain and is apprehensive of death. The convulsions last slightly over a minute, followed in 10 to 15 minutes by another convulsion. Death usually follows the second to fifth convulsion as a result of asphyxia.

Treatment.—In the treatment of victims of strychnine poisoning it must be emphasized that the convulsions are of reflex origin. All manipulations which are capable of furnishing sensory stimulus must be avoided. In general, treatment is as follows:

- 1. Prevention or control of convulsions by injection, intravenously, of quick acting barbiturates such as amobarbital sodium (Amytal).
- 2. If these are not available, chloral hydrate, paraldehyde, inhalations of chloroform, or tribromoethanol may be used.
- Gastric lavage may be employed to remove the poison from the stomach only when danger of convulsions has subsided.
- 4. Potassium permanganate may be given as a chemical antidote.
- 5. The patient should be kept warm, under close observation, and treated symptomatically.

Dose Usual: 2 mg. (1/30 grain)

#### Nux Vomica Tincture

Action and Use.—The action of the drug nux vomica is due to the strychnine it contains. It is used medicinally for the same purposes.

Dose Usual: 1 ml. (15 min.)

#### Picrotoxin

Action and Use.—Picrotoxin is a powerful central nervous system stimulant, resembling strych-

nine in action. It is administered intravenous	sly
in treatment of poisoning by hypnotic dru	
such as barbiturates, chloral, paraldehyde	or
sulfonal. This drug is to be discontinued	as
soon as the patient shows signs of recovery.	

NOTE: The toxic symptoms of picrotoxin resemble those of strychnine poisoning and the treatment is the same.

Dose Recommended: For poisoning, I.V. 6 mg. immediately, then 3 mg. every 15 minutes until a total of 15 mg. has been given

## Nikethamide (Coramine®)

Action and Use.—Nikethamide is used both orally and by injection as a respiratory stimulant and as a stimulant in acute circulatory failure not associated with cardiac disease. It has been used as an antidote in barbiturate poisoning with favorable results.

Dose Usual: I.M. or I.V., 1 ml. of 25% solution. Dose Range: 1 to 5 ml.

## Camphor (Gum Camphor)

Action and Use.—Camphor is used in the form of a liniment, it is used as a rubefacient and counterirritant, and it also has a mild anesthetic action on the skin. It is frequently employed in the form of the spirit for application to herpes on the lips. It is occasionally incorporated in ointments as an antipruritic. Official camphor water is used in eye washes for its cooling and soothing effect. Camphor is a stimulant to the central nervous system, having a marked effect on the higher centers. Therapeutic doses have little effect on respiration and its effect on the heart is variable, but it is still frequently used as a circulatory and respiratory stimulant by injection (camphor in oils ampuls).

Dose Recommended: I.M., 0.2 gram (3 grains)

#### Caffeine

Action and Use.—Caffeine stimulates all parts of the central nervous system especially the cortex, medulla, and spinal cord. Its action on the cortex produces a clearer and more rapid flow of thought and allays drowsiness and fatigue. It stimulates respiratory, vasomotor, and vagal centers in the medulla. It is used as a cardiac and respiratory

stimulant, and as a diuretic in the treatment of dropsy. For oral administration, caffeine itself or citrated caffeine is employed.

Dose Usual: 0.2 gram (3 grains)

Citrated caffeine, 0.3 gram (5 grains)

Dose Range: 0.1 to 0.5 gram

Caffeine and Sodium Benzoate

Action and Use.—Caffeine combined with sodium benzoate has the same use as caffeine and citrated caffeine (see above). It is the preparation of choice for injection and is available in a sterile solution in water for this purpose.

Dose Usual: Oral, 0.5 gram (7½ grains)
As injection, subcutaneous, I.M.,
0.5 gram (7½ grains)

Pentylenetetrazol (Metrazol®)

Action and Use.—Pentylenetetrazol has a powerful stimulating action on the medullary centers and midbrain. It is employed in the treatment of respiratory depression and circulatory collapse. It is also used in the treatment of barbiturate poisoning.

Dose Usual: I.V. or subcutaneous, 100 mg. Dose Range: 100 to 500 mg. as necessary

### **AUTONOMIC DRUGS**

The autonomic nervous system, also called the vegetative, visceral, or involuntary nervous system, controls the automatic functions of the body. It consists of nerves, ganglia, and plexuses which innervate the heart, blood vessels, glands, viscera, and smooth muscles. It is divided into the sympathetic and parasympathetic nervous systems.

The sympathetic nerves, when stimulated, usually discharge as a unit, and the effects can be noticed under circumstances of fright or rage. Stimulation of these nerves cause acceleration of the heart, a rise in blood pressure, the spleen to discharge red blood cells into the blood, a rise in the blood sugar level, and dilation of the pupils. These changes enable the body to be better prepared to fight.

The parasympathetic nerves do not all discharge at once. They are concerned with the functions of conservation and restoration rather than expenditure of energy. Their actions slow the heart, lower the blood pressure, stimulate gastrointestinal movements and secretions, aid absorption, contract the pupils, and empty the bladder and rectum.

Chemical Mediation of Nerve Impulses.—The theory is that nerve impulses effect responses in muscles and glands by liberating a chemical substance which acts as the major local exciting agent. Upon stimulation, the parasympathetic nerves release at their peripheral endings a chemical called acetylcholine. This substance is probably present in the tissues in a physiologically inactive form, and the nerve impulses change it to an active state in which it can be destroyed by cholinesterase. Cholinesterase is an enzyme present in blood tissues which acts by splitting acetylcholine into choline, a physiologically weak substance, and acetic acid. Cholinesterase appears to act as a check on the action of acetylcholine, and is usually present in tissues where acetylcholine is liberated by nerve impulses. The parasympathetic nerves are sometimes referred to as cholinergic nerves, and the sympathetic nerves as the adrenergic nerves.

Upon stimulation of the sympathetic nerves, sympathin, a substance similar to epinephrine, is liberated. It exists in two forms, sympathin E, an excitor, and sympathin I, an inhibitor.

The autonomic drugs act on structures innervated by the autonomic nerves, by either stimulating or depressing the effector cells. They do not affect the nerve endings; therefore, they cannot be called autonomic nerve depressants or stimulants. They will be discussed under various groups.

### PARASYMPATHOMIMETIC DRUGS

These drugs stimulate the structures which are innervated by the parasympathetic nerves and produce effects similar to those caused by stimulation of the nerves.

Methacholine Chloride (Mecholyl Chloride®, Acetylbetamethylcholine Chloride)

Action and Use.—Methacholine chloride is a synthetic drug having a similar action to acetylcholine and is used to produce a stimulating effect in the parasympathetic nervous system. It is used in certain cases of tachycardia, chronic ulcers, and urinary bladder retention due to atony. In case of overdosage, atropine sulfate (0.6 mg.) is an effective physiologic antidote.

CAUTION: Its use is contraindicated for asthmatic or hypertensive patients. It should never be administered intravenously.

Dose Usual: Subcutaneous, 20 mg.

Dose Range: 10 to 60 mg.

Carbachol (Carbamylcholine Chloride, Doryl®)

Action and Use.—This drug is similar in action to methacholine chloride. It is used to relieve urinary retention following labor or in postoperative cases, and in the treatment of abdominal distension due to postoperative intestinal ileus. It is used mainly in the treatment of eye diseases such as glaucoma.

Dose Recommended: Oral, 0.2 mg. (1/300 grain) Subcutaneous, 0.25 mg. (1/250 grain)

Topical, ¾ to 1½% ophthalmic solution or ointment

Neostigmine Bromide (Prostigmin Bromide®)

Action and Use.—Neostigmine acts like physostigmine by inhibiting cholinesterase. It is used for the relief of abdominal distention, in treatment of atony of the urinary bladder, in the treatment of myasthenia gravis, and in the stimulation of intestinal peristalsis. It causes contraction of skeletal muscles.

Dose Usual: 15 mg. 3 times a day

Dose Range: 15 to 30 mg.

Neostigmine Methylsulfate (Prostigmin Methylsulfate)

Action and Use.—This drug is used for the same purposes as neostigmine bromide; however, it is prescribed primarily for the relief of abdominal distention.

Dose Usual: Subcutaneous or I.M., 0.5 mg. (1/120 grain) every 4 to 6 hours

Dose Range: 0.25 to 1 mg.

#### Pilocarpine Nitrate

Action and Use.—Pilocarpine stimulates the smooth muscle and gland cells innervated by cholinergic nerves, especially the sweat and salivary glands. It produces miosis and other effects such as stimulation of the smooth muscles of the intestinal tract, an increase in tone and motility of the ureters, urinary bladder, gallbladder and biliary ducts.

It is used as a miotic in the treatment of glaucoma and other eye diseases, after mydriasis, and occasionally as a diaphoretic in the treatment of edema. It is sometimes incorporated into cough mixtures as an expectorant. It is a physiologic antidote in atropine poisoning.

Toxicology.—The symptoms appear quickly after ingestion of the drug and soon reach their peak. The first noted are flushing of the face and neck followed by profuse sweating and salivation, intestinal disturbances, violent peristalsis, colic, and persistent purging. This is accompanied by nausea and vomiting, fibrillary twitching of muscles throughout the body, pinpoint contraction of the pupils, blurred vision, lacrimation, dyspnea, increased pulmonary secretions, urinary urgency, difficulty in voiding, pale skin bathed in cold perspiration, rapid cardiac rate, weak pulse, and blood pressure at shock level. Death may be due to pulmonary or central respiratory paralysis.

Treatment.—Treatment following ingestion consists of:

1. Atropine sulfate hypodermically 1.2 mg. (1/50 grain), or intravenously 0.5 mg. (1/120 grain),

as the physiologic antidote.

2. Followed by symptomatic treatment.

Dose Usual: Oral or subcutaneous, 5 mg. (1/12)

Topical, as 0.5 to 2% ophthalmic solution

Dose Range: 5 to 20 mg.

Physostigmine Salicylate (Eserine Salicylate)

Action and Use.—Physostigmine exerts its action by preventing the enzymatic destruction of acetylcholine by cholinesterase, thus permitting the acetylcholine to exert all its characteristic actions in an intensified manner. Its more important therapeutic effects are on the pupil of the eye and the intestinal and skeletal muscles. Other responses are of toxicologic interest. It is used as a miotic, particularly in the treatment of glaucoma, and after mydriasis. It is also employed in the treatment of abdominal distention due to postoperative intestinal ileus.

Toxicology.—Symptoms and treatment are the same as for poisoning by pilocarpine.

Dose Usual: Oral, 2 mg. up to 3 times a day Topical, as a 0.1% to 1% ophthalmic solution

Dose Range: 1 to 3 mg.

#### SYMPATHOMIMETIC DRUGS

These drugs stimulate the structures innervated by the sympathetic or adrenergic nerves, producing an effect similar to that caused by stimulation of these nerves.

Epinephrine (Adrenalin®, Suprarenalin)

Action and Use.—Epinephrine is usually employed in the form of a hydrochloride in solution. Its most important actions are on the heart and blood vessels. It accelerates the heart rate, increases the cardiac output, and alters the cardiac rhythm. It constricts the blood vessels in some areas and dilates them in others. The vessels of the skin and mucosa are constricted after local application or injection of the drug, while those of the skeletal muscles are dilated by injection. An intravenous injection produces an almost immediate rise in blood pressure. It relaxes the bronchial musculature and the muscles of the gastrointestinal tract and urinary bladder. When applied locally to the eye, it has a mydriatic effect on some patients.

Epinephrine is used to control hemorrhage from minor cuts, although it is not effective when a vein or artery is involved. It relieves nasal congestion by vasoconstriction for a short duration. It is used in conjunction with local anesthetics to prolong their action and to lessen the possibility of hemorrhage, and it is given during spinal anesthesia to maintain blood pressure. Epinephrine is valuable in the treatment of acute cardiac failure and in the resuscitation of cardiac arrest. It is often employed in the treatment of bronchial asthma, in the form of the injection or by inhalation. It is also used to provide relief of certain as urticaria, serum allergic disorders such reactions, and hay fever.

NOTE: See Vasoconstrictor Drugs, this chapter, for futher discussion.

Dose Range: Hypodermic, 0.2 to 1.0 ml. of 1:1000 solution
Inhaled, 1:100 aqueous solution

Phenylephrine Hydrochloride (Neo-Synephrine Hydrochloride®)

Action and Use.—This drug has a vasopressor action when injected or taken orally. When applied locally to mucous membrane, it acts as a vasoconstrictor reducing swelling and congestion.

It is often combined with local anesthetics in a similar manner as epinephrine hydrochloride.

NOTE: See Vasoconstrictor Drugs, this chapter, for further discussion.

Dose Usual: Subcutaneous or I.M., 5 mg. 3 times a day

Dose Range: 1 to 10 mg.

#### Ephedrine Sulfate

Action and Use.—Ephedrine is similar in action to epinephrine, although it differs from it in many ways. It is more stable, can be given by mouth, and its action lasts longer. It stimulates the central nervous system and respiration. Its constrictor effects are less marked, although it does not produce any after congestion. However, if used too often, it may lose its effectiveness. Its mydriatic effect is better than that of epinephrine.

Ephedrine is used in the form of a spray or as nose drops for the relief of nasal congestion and bronchial asthma. It is effective in the treatment of certain allergic disorders such as hay fever or hives, and is given with spinal anesthesia to maintain blood pressure. It is employed as a mydriatic in ophthalmology because it has no cycloplegic effect. Ephedrine is occasionally employed to allay motion sickness and in the treatment of narcolepsy. (See Vasoconstrictors, this chapter, for further discussion.)

Dose Usual: Oral or subcutaneous, 25 mg. every 4 hours

Dose Range: 25 to 50 mg.

Levarterenol Bitartrate (Levophed®)

Action and Use.—See Vasoconstrictors, this chapter, for discussion.

Amphetamine Sulfate (Benzedrine®)

Action and Use.—Amphetamine sulfate is a central nervous system stimulant tending to abolish fatigue and mental depression. Its effects on the higher nerve centers are so pronounced that it is rarely used for any other action. It is employed in the treatment of narcolepsy, mental depression, treatment of alcoholism, and as an appetite depressant to control obesity.

Toxicology.—Amphetamine sulfate may, in certain instances, produce overstimulation, restlessness, sleeplessness, gastrointestinal disturbances, chills and collapse. Caution should be exercised in administering this drug to patients suffering

from hypertension or cardiovascular disease. This drug should not be administered intravenously.

Dose Usual: 10 mg. twice a day Dose Range: 2.5 to 10 mg.

Methamphetamine Hydrochloride (Desoxyephedrine)

Action and Use.—The uses of this drug are similar to those of amphetamine sulfate. It is believed to be more powerful as a stimulant, but less active on the cardiovascular system.

Dose Usual: 5 mg. (1/12 grain) once or twice a day

Dose Range: 2.5 to 5 mg.

## Dextro Amphetamine Sulfate (Dexedrine®)

Action and Use.—The action of this drug is similar to that of amphetamine and it is used in the treatment of obesity to decrease appetite. It also creates a feeling of well being in mildly depressed individuals.

NOTE: This drug is sometimes combined with amobarbital and is known by the proprietary name of Dexamyl. Dexamyl is used to create a sense of well being in depressed individuals.

Dose Usual: 5 mg. twice a day Dose Range: 2.5 to 5 mg.

## PARASYMPATHOLYTIC DRUGS

#### (Anticholinergic Drugs)

These drugs block many of the responses to cholinergic nerves and are known as antiparasympathomimetic agents or parasympathomimetic depressants. When used orally, these drugs cause diminished motility and secretion in the gastrointestinal tract. Their effects on the eyes, heart, and other organs of the body will be discussed in detail under individual drugs.

## Atropine (Alkaloid obtained from belladonna)

Action and Use.—Atropine has two major actions: (1) On the central nervous system, it stimulates the medulla and higher centers and causes an increase in respiration; and (2) on the smooth muscles and secretory glands, it relaxes the muscles of the intestinal tract, bronchi, ureter, biliary ducts, and gallbladder. It inhibits glandular secretions causing dryness of the nose, throat, bronchi, mouth, and skin.

Atropine has a mydriatic effect on the pupil of the eye and causes a paralysis of accommodation. It may also cause a slight rise in body temperature. It has a dulling effect on the sensory nerve endings and is often used as an anodyne. Atropine is used as a mydriatic and cycloplegic in ophthalmology, as an anhidrotic, in large doses as a circulatory stimulant, and as a respiratory stimulant in certain poisonings. It is a physiologic antidote for eserine, prostigmine, pilocarpine, nerve gases, and muscarine. This drug is used to relax spasms of the intestinal tract and those of the bronchi in bronchial asthma. Atropine is given with morphine to overcome the respiratory depressant effects of morphine. It is usually employed in the form of its sulfate salt.

Toxicology.—Symptoms include warmth and dryness of the mouth; difficulty in swallowing and talking; mydriasis; blurred vision; intolerance of light; hot, dry skin; a rash resembling that of scarlet fever on the face, neck, and upper body; a rise in body temperature; giddiness; muscular incoordination; confusion; hallucinations, delirium, or mania are often known to occur. These symptoms may persist for several hours. Death is due to respiratory failure.

Treatment.—Treatment consists of:

1. If atropine has been taken orally, gastric lavage with a chemical antidote. Administer pilocarpine as a physiologic antidote.

2. Symptomatic treatment.

CAUTION: Atropine injection is not to be used except as an antidote for poisoning by nerve gases.

Dose Recommended: Atropine sulfate 0.5 mg. (1/120 grain)

Topical, as 1 to 2% solution

Dose Range: 0.3 to 1.2 mg.

#### Belladonna Leaf (Deadly Nightshade Leaf)

Action and Use.—Belladonna leaf is rarely employed. The activity of the drug resides in the atropine, and its therapeutic uses are the same as those of the alkaloid. If used, it is usually in the form of tincture.

Dose Usual: Tincture, 0.6 ml. (10 min.) 3 times a day

Dose Range: 0.3 to 2.4 ml.

#### Homatropine Hydrobromide

Action and Use.—Homatropine hydrobromide is a synthetic alkaloid. It is less active and toxic

than atropine. The drug is used solely for its mydriatic effects on the eye. It is preferable to atropine because its effect is of short duration.

Dose Usual: Topical, as 1 to 4% ophthalmic solution

Scopolamine Hydrobromide (Hyoscine Hydrobro-

Action and Use.—Scopolamine differs from atropine in its action on the central nervous system. Atropine may first stimulate and then depress the brain, but scopolamine is primarily a depressant and therapeutic doses will cause drowsiness, fatigue, and sleep. Its actions on the eye, heart, intestines, and bronchi are similar to those of atropine but more pronounced and prolonged.

It is used as a sedative in delirium tremens, maniacal states, cardiac and hyperthyroid psychoses, and nervous unrest (particularly in the withdrawal treatment of opium and alcohol). It is useful in ophthalmology as a mydriatic of short duration. It is frequently used with morphine for preanesthetic medication in order to allay apprehension. Because of its sedative and tranquilizing effects, it is often prescribed to prevent motion sickness. Unlike atropine it has little stimulating effect on respiration.

Toxicology.—Medicinal doses of scopolamine occasionally produce toxic symptoms. Some individuals are excessively susceptible to the drug. The symptoms are the same as in atropine poisoning.

Treatment.—Treatment of scopolamine poisoning

is the same as for atropine.

Dose Recommended: Oral or parenteral, 0.6 mg. (1/100 grain)

> Topical, as 0.2% ophthalmic solution

Eucatropine Hydrochloride (Euphthalmine)

Action and Use.—Eucatropine is used solely as a mydriatic. Its effect is rapid and of short duration. Maximum dilation occurs in 30 minutes and the effects disappear in about 3 hours. It causes no loss of accommodation. Eucatropine has other peripheral actions similar to those of atropine but is weaker.

Dose Usual: Topical, as a 2% solution

Hyoscyamus (Henbane)

Action and Use.—Hyoscyamus leaf is rarely used. It resembles belladonna in action and uses. However, the presence of a larger proportion of scopolamine makes it a central depressant. Its important use is in the relief of painful spasms of the unstriated muscle, as in irritable bladder and in cystitis. It is usually employed in the form of a tincture.

Dose Usual: Tincture, 2 ml. (30 min.)

Methantheline Bromide (Banthine Bromide®)

Action and Use. This is a synthetic drug which resembles atropine in action. It is used in the treatment of peptic ulcer because it decreases motility of the gastrointestinal tract and relieves acidity. Its chief advantages over atropine are fewer undesirable effects and a more prolonged therapeutic action. It is sometimes prescribed to prevent motion sickness. Common side effects are dry mouth and blurred vision.

Dose Usual: Oral, 50 mg. 4 times a day Dose Range: 25 to 100 mg.

Propantheline Bromide (Pro-Banthine®)

Action and Use. - This drug is similar in action to methantheline bromide although it is considerably more potent and possesses fewer undesirable side effects.

Dose Recommended: 15 mg. 3.times a day

# SYMPATHOLYTIC AGENTS (Adrenergic Blocking Agents)

Sympatholytic (antisympathomimetic) agents are antagonistic to epinephrine and are sometimes called adrenolytic agents. They lower blood pressure by vasodilatation and increase gastrointestinal tone. They block the vasoconstricting and blood pressure effects of epinephrine.

Until recently, drugs capable of blocking or reversing responses to adrenergic stimuli were unavailable, lacked adequate specificity, or were objectionable because of side effects. newly introduced agents are still undergoing clinical investigation, enough favorable reports have appeared to warrant inclusion of the more important drugs in this class.

Azapetine Phosphate (Ilidar Phosphate®)

Action and Use.—Azapetine phosphate is a potent sympatholytic agent which exerts a vasodilating effect on small blood vessels. It produces peripheral vasodilation and increases peripheral blood flow. Azapetine is used for the treatment of such conditions as Raynaud's syndrome and ulcerations of the extremities due to frostbite. The drug is ineffective in Buerger's disease.

Side Effects.—Side effects are fairly common and consist of nausea, vomiting, weakness, and hypotension.

Dose Recommended: 25 mg. 3 times a day for 7 days, initially
Maintenance, 50 mg. 3 times a day

Phentolamine Hydrochloride (Regitine Hydrochloride®)

Action and Use.—Phentolamine hydrochloride is used in the diagnosis and control of hypertension caused by certain tumors in the adrenal medulla and in the treatment of certain vascular diseases in which blood flow can be increased to the extremities. The drug is useful in the treatment of frostbite and immersion foot. It is useful in Raynaud's disease.

Side Effects.—Side effects such as tachycardia may follow administration, and also gastrointestinal disturbances such as nausea, vomiting, and diarrhea.

Dose Recommended: 50 mg. 4 to 6 times a day

Tolazoline Hydrochloride (Priscoline Hydrochloride<sup>®</sup>)

Action and Use.—Tolazoline hydrochloride is a potent sympatholytic drug. It is reputed to block impulses by sympathetic nerves and blocks the vasoconstrictive action of epinephrine and levarterenol. This drug also produces a dilating effect on small bloood vessels. It is useful in the treatment of Buerger's disease, frostbite, complications of diabetes arising from peripheral vascular causes, Raynaud's disease, and in ulcers of the extremities.

Side Effects.—Side effects such as flushing, feeling of warmth, tachycardia, nausea and gastrointestinal upset, may occur.

Dose Recommended: Orally, 25 mg. 4 to 6 times a day

#### Oxytocics

Oxytocics or ecbolics are drugs which produce a rhythmic contraction of the uterus. Their action is selective for the uterus, although other smooth muscles are affected. The most important oxytocics are the alkaloids of ergot (ergonovine and ergotamine) and oxytocin, the oxytocic principle extracted from the posterior pituitary.

Ergot (Rye Ergot, Rye Smut)

Action and Use.—The active principles of ergot are ergotamine, ergotoxine, and ergonovine. Ergotamine and ergotoxine are similar in their pharmacologic action. They have a stimulating effect on the uterus. They increase the blood pressure by constriction of the smaller blood vessels and may damage the capillary endothelium causing vascular stasis, thrombosis, and gangrene. They also slow the heart. Ergonovine also stimulates the uterus and its action is more rapid. The response after intravenous injection is almost immediate and, after oral administration, it takes place in a few minutes. For this reason it is preferred as an oxytocic. Ergonovine is readily absorbed through the intestinal tract.

Ergot is undependable in action and subject to deterioration; therefore, its clinical use has decreased since the discovery of ergonovine. If prescribed it is usually employed in the form of the fluid extract.

Toxicology.—In acute poisoning, the symptoms consist of paleness and coldness of the skin, partial paralysis with numbness and tingling sensation of limbs, feeble pulse, and possible abortion in pregnancy. In chronic poisoning, which may occur by ingestion of rye infected with ergot, the symptoms are gangrene in the extremities, increased rapidity or slowing of heart action, high or low blood pressure, headache, nausea, vomiting, diarrhea, and sometimes blindness.

Treatment.—The treatment is symptomatic.

Dose Usual: Fluid extract, 2 ml. daily.

Ergonovine Maleate (Ergometrine Maleate, Ergotrate®)

Action and Use.—Ergonovine maleate is used as an oxytocic.

Dose Usual: I.V., I.M., or oral, 0.2 mg. (1/300 grain)

Dose Range: 0.2 to 0.5 mg.

Ergotamine Tartrate (Gynergen®)

Action and Use.—Ergotamine specifically blocks the effects of stimulation of adrenergic nerves. It also prevents response to epinephrine stimula-

tion. Large doses cause vasoconstriction and increase in blood pressure. Ergotamine has a variable action on the central nervous system. Caffeine acts as a synergist and is available in tablet form in combination with ergotamine tartrate. Ergotamine tartrate is a valuable drug for relieving migraine headache. It increases the motor activity of the uterus but is less efficient than ergonovine and is seldom used as a uterine stimulant.

NOTE: This drug is specific for migraine. It is listed in this section for convenience of classification.

Dose Usual: Oral, 2 mg. followed by 1 mg. every ½ hour

I.M., 0.25 mg. repeated in 1 hour if needed

Dose Range: Oral, 1 to 6 mg.

I.M., 0.25 mg. to 0.5 mg.

Oxytocin Injection (Pitocin®)

Action and Use.—This is the water soluble principle of the posterior lobe of the pituitary gland which possesses oxytocic properties. This drug is also discussed under Hormones and Synthetic Substitutes, Posterior Pituitary, this chapter.

Dose Usual: I.M., 1 ml. repeated in 30 minutes if necessary

Dose Range: 0.3 to 1 ml.

# HISTAMINE ANTAGONIZING AGENTS

(Antihistamines)

Histamine has been demonstrated to have an important role in allergenic reactions. This fact has led to the development of compounds that oppose it. These compounds apparently compete with histamine at the site of action. There are many antihistamines. The group discussed herein is incomplete though representative.

CAUTION: Since drowsiness and dizziness are prominent side reactions, individuals driving automobiles or working with machinery should be cautioned when using these drugs.

Diphenhydramine Hydrochloride (Benadryl®)

Action and Use.—Diphenhydramine hydrochloride has the ability to antagonize the pharmacologic effects of histamine. It reduces the bronchoconstriction produced by histamine. This drug

is used in the symptomatic treatment of urticaria, allergic rhinitis, serum reactions, and other allergic conditions. It will sometimes relieve the itching of infantile eczema. The principal side reactions are the production of drowsiness, dizziness, and gastrointestinal upset.

Dose Usual: 25 mg. up to 4 times a day. Dose Range: 25 to 50 mg.

Tripelennamine Hydrochloride (Pyribenzamine®)

Action and Use.—The therapeutic action of tripelennamine hydrochloride is similar to that of diphenhydramine hydrochloride. It has local anesthetic properties and is used in antisunburn lotions because of a property that causes absorption of certain wave lengths in the sunburn spectrum. It may cause gastrointestinal distress and drowsiness.

Dose Usual: 50 mg. up to 3 times a day Dose Range: 50 to 100 mg.

Chlorpheniramine Maleate (Chlor-Trimeton®)

Action and Use.—This drug is similar in action to diphenhydramine and has fewer side effects.

Dose Usual: 4 mg. up to 4 times a day Dose Range: 2 to 8 mg.

Promethazine Hydrochloride (Phenergan®)

Action and Use.—This drug has therapeutic properties similar to diphenhydramine.

Dose Usual: 12 mg. (1/2 grain)

Meclizine Hydrochloride (Bonamine®)

Action and Use.—Meclizine hydrochloride is an antihistaminic drug of long duration of action. It is administered for relief of motion sickness and for control of nausea and vomiting associated with pregnancy. Common side effects are drowsiness and blurring of vision.

Dose Recommended: 25 mg. once daily

Dimenhydrinate (Dramamine®)

Action and Use.—The actions of dimenhydrinate are similar to the other antihistamine compounds; however, this drug enjoys its greatest usefulness in the prevention and treatment of motion sickness. It is also useful in controlling nausea and vomiting in connection with radiation sickness, hypertension, and dysfunctions associated with streptomycin therapy. This drug has been used as an

antiemetic agent to alleviate postoperative and postanesthetic nausea and vomiting.

Dose Usual: 50 mg. 4 times a day Dose Range: 50 to 100 mg.

# CARDIOVASCULAR DRUGS CARDIAC DRUGS

The heart is affected in one way or another by many drugs, but there are few that actually exert a stimulating action directly on the heart muscle itself. The most important of these are the glycosides of digitalis—digitoxin, gitoxin, gitalin, and lanatoside C.

In moderate doses, digitalis drugs or derivatives may produce a constriction of the arteries, but the blood pressure is seldom affected due to the slow pulse. When there is an accumulation of fluid in the body, as in dropsy, the cardiac glycosides cause profuse diuresis, probably due to improved circulation. The digitalis preparations are used for the treatment of congestive heart failure, auricular fibrillation, and paroxysmal tachycardia. These preparations prolong refractory periods of the heart, act directly on the heart muscle, diminish the size of the heart, and increase the output of the diseased heart. In patients with auricular fibrillation, they slow the heart rate. They are generally given orally, but may be administered intravenously in emergency situations.

# Powdered Digitalis (Foxglove)

Action and Use.—Digitalis and closely allied drugs have a powerful action on the heart muscle and are invaluable in the treatment of various forms of chronic heart disease and cardiac failure. In therapeutic doses they cause an increase in the force of the systolic beat, improving nutrition to the heart and the body generally, and a slowing of the cardiac rate, giving the heart more time to rest.

Digitalis is cumulative since it is eliminated more slowly than it is absorbed. Digitalization is a saturation of the body with digitalis until optimum effects are obtained. The initial dose is given over a prolonged period of time (usually 24 to 48 hours). Mild nausea and vomiting usually follow, indicating the body is saturated with digitalis. A maintenance dose is then prescribed. Digitalis sometimes is prescribed as tincture.

Toxicology.—As mentioned above, digitalis is cumulative. The symptoms of poisoning are nausea and vomiting with muscular weakness and possible visual disturbances. The pulse is slow at first but later may become rapid and irregular.

Treatment.—The treatment is discontinuance of the drug, keeping the patient in a recumbent position, evacuation of the stomach if necessary, and symptomatic treatment.

NOTE: When digitalis is prescribed, powdered digitalis U.S.P. is to be dispensed because it has a minimum and maximum limit of standard; 100 mg. digitalis is equivalent to 1 U.S.P. Digitalis Unit.

Dose Usual: Initial, 1.5 grams divided over 24 to 48 hours; maintenance, 100 mg. daily

As tincture, 1 ml. (15 min.)

Dose Range: Initial, 1 to 2 grams; maintenance, 100 to 200 mg.

Digitoxin (Digitaline Nativelle®, Crystodigin®)

Action and Use.—Digitoxin has an advantage over digitalis in that the dose is smaller and very little nausea and vomiting are produced. It is gradually replacing digitalis powder because the dosage can be determined more acurately and because of its chemical purity. It makes rapid digitalization possible with little gastrointestinal irritation.

Dose Usual: Initial dose, 1.5 mg. over 24 to 48 hours in divided doses; maintenance, 0.1 mg. (\%00 grain)

Digoxin (Lanoxin)

Action and Use.—Digoxin, like digitoxin, produces the characteristic digitalis effects rapidly. It is given in small dosage. Overdosage may produce toxic symptoms similar to those of digitalis. It is administered orally.

Dose Usual: Initial, 1.5 mg. or 3 mg. over 24 hours; maintenance, 0.5 mg. (1/20 grain)

Dose Range: Initial, 0.5 to 2 mg.; maintenance, 0.25 to 0.75 mg.

Lanatoside C (Cedilanid®)

Action and Use.—Lanatoside C is a glycoside

obtained from the leaves of *Digitalis lanata*. Its use is similar to that of digoxin.

Dose Usual: Oral, initial, 8 mg. (% grain); maintenance, 1 mg. (% grain)

## Quinidine Sulfate

Action and Use.—Quinidine sulfate is a cardiac drug, but its action differs somewhat from that of the digitalis group. It is a depressant to the cardiac muscle and is used extensively in the treatment of auricular fibrillation and paroxysmal tachycardia. It resembles quinine in being a general protoplasmic poison, in its antipyretic and oxytocic action, and its antimalarial properties.

Dose Usual: 0.2 gram (3 grains) up to 6 times a day

Dose Range: 0.2 to 0.4 gram

Procainamide Hydrochloride (Pronestyl Hydrochloride®)

Action and Use.—This is a relatively new drug used to treat auricular fibrillation and ventricular arrhythmias. Like quinidine it is classified as a cardiac depressant. It may cause toxic effects such as nausea and vomiting and may cause hypertension when given intravenously. It may also cause certain blood dyscrasias.

Dose Usual: Oral, 1.5 grams 4 times a day I.V., 1 gram

Dose Range: Oral, 500 mg. to 1.5 grams I.V., 250 mg. to 1 gram

## VASODILATORS AND ANTIHYPERTENSIVES

These drugs cause vasodilation and thereby lower the blood pressure. The vasodilator nitrites relax smooth muscles of the blood vessels. A fall of blood pressure is the most important pharmacologic action. Their relaxation of the coronary arteries is the basis of their chief use in the relief of pain in angina pectoris. Their action on the blood vessels of the skin produces flushing and sweating. They may produce headache, probably by dilation of the smaller vessels of the meninges, which increases the cranial pressure. They also relax the smooth muscles of the gastrointestinal and genitourinary tracts. Because of their action on the bronchial muscles, they are used in the relief of bronchial spasm. Large doses of nitrites convert hemoglobin to methemoglobin. In the treatment of cyanide poisoning where this effect is desired, either sodium nitrite or amyl nitrite is used.

Toxicology.—Large doses of nitrites produce irritation of the stomach, nausea and vomiting, severe headache, confusion, shallow and irregular but somewhat accelerated respiration, and methemoglobin causing cyanosis.

Treatment.—If the overdosage of nitrites was taken orally, treatment is as follows:

1. Gastric lavage.

2. Inhalations of oxygen.

- 3. Injection of small dose of methylene blue.
- 4. Blood transfusion if methemoglobin is present.
  - 5. Keep the patient's head low.
  - 6. Treat symptomatically.

#### Amyl Nitrite

Action and Use.—Amyl nitrite is used when immediate vasodilation is desired, especially in angina pectoris. It increases the circulation in the coronary arteries while lowering the blood pressure. Containers for amyl nitrite are wrapped loosely in gauze and cotton and can readily be crushed with the fingers and the contents then inhaled.

CAUTION: Amyl nitrite is very flammable.

Dose Usual: 0.3 ml. (5 min.) by inhalation

#### Sodium Nitrite

Action and Use.—Sodium nitrite is used chiefly in the treatment of arterial hypertension. Its action is very slow.

Dose Usual: 30 mg. 3 times a day

Dose Range: 30 to 60 mg.

Glyceryl Trinitrate Tablets (Nitroglycerin, Trinitrin)

Action and Use.—Glyceryl trinitrate acts very quickly. The blood pressure drops rapidly after oral administration and the action is completed within about one-half hour. It is used where rapidity of action is desired as in angina pectoris, threatened apoplexy, and asthma. It should be administered with caution, as it may produce severe headache.

Dose Usual: Sublingual, 0.4 mg. up to 10 times

a day

Dose Range: 0.2 to 0.6 mg.

## Pentaerythritol Tetranitrate Tablets (Peritrate®)

Action and Use.—The vasodilating effects of pentaerythritol tetranitrate are of slower onset but more prolonged than those of the nitrites. It is used to lower the blood pressure in various circulatory disturbances where constant effect is desired.

Dose Recommended: Oral, 10 mg. 3 to 4 times daily

Dose Range: Oral, 10 to 20 mg. 3 to 4 times daily

#### Mannitol Hexanitrate Tablets

Action and Use.—Mannitol hexanitrate is an explosive compound formed by the nitration of mannitol. It is much less stable than nitroglycerin. It is used in pharmaceutical preparations as a 10 percent mixture with carbohydrates, in which it is nonexplosive. The fall in blood pressure lasts 4 to 6 hours. It is not effective in angina pectoris.

Dose Recommended: Oral, 15 to 60 mg. every 4 to 6 hours

## Erythrityl Tetranitrate Tablets

Action and Use.—Erythrityl tetranitrate is similar in action to pentaerythritol tetranitrate.

Dose Usual: Oral, 30 mg.

## Hydralazine Hydrochloride (Apresoline®)

Action and Use.—This drug is an antihypertensive agent that relieves high blood pressure and increases blood flow through the kidneys. It is of value in management of essential hypertension, hypertension after sympathectomy, and hypertension associated with toxemias of pregnancy.

Side Effects.—Headache, appearance of arthriticlike pains (an indication for cessation of treatment), tachycardia, dizziness, weakness, nausea and vomiting, and severe hypotension. There may be numbness and tingling of extremities.

Dose Recommended: Oral, 40 to 200 mg. daily in divided doses, reached gradually over a period of a week

# Reserpine (Serpasil®, Sandril®)

Action and Use.—Resperine is a pure crystalline alkaloid of *Rauwolfia*, a medicinal shrub from India. It produces a gradual, sustained lowering

of blood pressure, has a tranquilizing effect, and produces a sense of well-being in anxiety and hypertension. It is a possible substitute for electroconvulsive therapy in treatment of neuropsychiatric conditions such as schizophrenia.

Side Effects.—Mild drowsiness, nasal stuffiness or congestion, increased frequency of defecation or looseness of stools.

Dose Recommended: Oral, 0.5 mg. daily, but must be adjusted according to response of patient

Dose Range: 0.1 to 1 mg.

## Pentolinium Tartrate (Ansolysen®)

Action and Use.—This drug is used in the selective management of severe, moderately severe, and malignant stages of hypertension. It possesses the same side effects as the other ganglionic blocking agents.

Dose Range: Oral, 60 mg. to 600 mg. daily after being adjusted over a period of weeks

## Hexamethonium Bromide (Bistrium®)

Action and Use.—This drug blocks both sympathetic and parasympathetic ganglia resulting in vasospasm of the lower extremities, increased blood flow, and hypotension. It is effective for controlling severe hypertension and cardiac decompensation or in the treatment of peripheral vascular disorders.

CAUTION: The drug should be used cautiously, if at all, in patients with myocardial ischemia, cerebral ischemia, and renal failure. It must be employed with caution in elderly patients, in those with arteriosclerosis, or in those who have recently lost blood.

Dose Usual: Administered parenterally in amounts depending upon response desired

#### **VASOCONSTRICTORS**

Vasoconstrictors cause a constriction of the blood vessels. They act on the same mechanism as the vasodilators. They are used to raise the blood pressure, but they have several other uses. Some of them were discussed previously in greater detail under the heading of Sympathomimetic Drugs, this chapter.

Epinephrine (Adrenalin)

Action and Use. - Epinephrine occurs naturally in the medulla of the adrenal gland. One of the main therapeutic actions is to constrict peripheral blood vessels when applied locally. It controls capillary hemorrhage and shrinks mucous membranes of the nose. It is used to localize the effects of anesthetic agents such as procaine hydrochloride. It is used to treat urticaria and anaphylactic shock. Because it relaxes bronchi, it is used to treat asthma. Epinephrine raises blood sugar and should be employed with caution when treating diabetics. It is generally used in the form of epinephrine hydrochloride in solutions as follows: 1: 100 for treatment of asthma by means of a nebulizer, 1: 1,000 for subcutaneous injection or topical application.

CAUTION: Do not use epinephrine solution if it is brown in color or contains a precipitate.

Dose Usual: Topical, as 1: 1,000 solution Injection, subcutaneous, 0.5 mg. of 1: 1,000 solution every 4 hours

Dose Range: Injection, 0.2 to 1.0 mg.

Levarterenol Bitartrate (l-Norepinephrine Bitartrate, Levophed<sup>®</sup>)

Action and Use.—Levarterenol bitartrate is a powerful vasoconstrictor. It is used to raise the blood pressure in severe hypotension during and after surgical operations and in hemorrhage. It does not replace intravenous administration of fluids or blood volume expanders in treating hemorrhage, but is generally added to an intravenous fluid such as isotonic saline or 5 percent dextrose in saline. Patients receiving this drug should have their blood pressure taken every few minutes to avoid overdosage.

CAUTION: Do not use solution of levarterenol bitartrate if brown in color or contains a precipitate.

Dose Usual: İ.V. infusion, 5 mcg. per minute Dose Range: 1 to 10 mcg.

Phenylephrine Hydrochloride (Neo-Synephrine Hydrochloride®)

Action and Use.—Phenylephrine hydrochloride is a synthetic drug which raises blood pressure and is relatively nontoxic. It shrinks mucous membranes of the nose and relieves local conges-

tion. It slows absorption of local anesthetics and is used in the management of hypotension caused by the failure of blood vessels to contract, but not that following loss of blood volume. In ophthalmology it is used as a mydriatic.

Dose Usual: Subcutaneous or I.M., 5 mg. 3 times a day

Topical, 0.3 ml. of a ¼ to ½% solution every 4 hours

Dose Range: Subcutaneous or I.M., 1 to 10 mg. Topical, 0.1 to 0.5 ml.

Naphazoline Hydrochloride (Privine®)

Action and Use.—Naphazoline hydrochloride is a vasoconstrictor with prolonged action. It is used to relieve swelling of nasal mucosa and obstructions to openings of accessory nasal sinuses. It is administered in a strongly buffered solution.

Side Effects.—A consistent side effect is a rebound congestion of the mucosa which congestion increases in prominence after prolonged use. Longterm therapy with naphazoline is, therefore, not recommended.

CAUTION: Overdosage in young children may lead to deep sleep or coma. Treat with caffeine; oxygen under pressure with airway.

Dose Recommended: Nasal, 2 drops 0.05% solution every 3 to 6 hours

Dose Range: 0.05 to 0.1% solution depending upon sensitivity of mucosa

**Ephedrine** 

Action and Use.—Ephedrine is an alkaloid used to shrink the nasal mucosa when applied locally in a saline solution. It raises blood pressure in patients undergoing spinal anesthesia. It is also employed in certain types of hypotension. The action of ephedrine is more sustained than that of epinephrine and it is used to treat patients with urticaria and hay fever. It relaxes smooth muscle and relieves bronchial constriction, hence its value in asthmatic conditions. The salts of ephedrine, particularly the sulfate or hydrochloride, are, as a rule, employed for the systemic effects of the alkaloid.

Dose Usual: As sulfate, oral or subcutaneous, 25 mg. every 4 hours
Topical, 1% solution in saline

Dose Range: 25 to 50 mg.

Tetrahydrozoline Hydrochloride (Tyzine ®)

Action and Use.—This is a sympathomimetic agent and when applied topically to the nasal mucosa the drug causes vasoconstriction. It is useful in rhinitis, sinusitis, and hay fever. Occasionally rebound vasodilation may result. It must be administered with caution to hypertensive and hyperthyroid patients.

Side Effects.—Side effects such as coma and shock have been caused by overdosage in young children by a 0.1 percent solution.

CAUTION: The 0.1 percent solution should never be administered to children under 6 years of age.

Dose Recommended: Adult, 2 to 3 drops of 0.1% solution every 3 hours Children, 2 drops of 0.05% solution every 6 hours

## **DIURETICS**

Diuretics are drugs which increase the secretion of urine. They are used to remove fluid from the body, as in dropsy or edema, to dilute the urine and render it less irritating to the mucous membrane of the bladder, and to aid in eliminating toxic matter through the kidney. Diuretics should be employed with caution, particularly in treating certain inflammatory and diseased conditions like nephritis. In these conditions, the kidney is frequently incapable of responding to the diuretic action.

The daily urine output in a healthy man is about 1,500 milliliters. The amount secreted depends upon the functional state of the kidney epithelium and the amount of blood passing through the renal artery. The blood supply to the kidney is influenced by the total quantity of blood in the body, the velocity of the blood current, the relative size of the renal artery and the general arterial system.

#### Water (Aqua)

Action and Use.—Water is a true physiologic diuretic. It is seldom spoken of as a drug, although forcing fluids is recognized as a therapeutic measure. It is not employed as a diuretic in edematous conditions because it would increase the accumulation of the edema fluid.

#### Sodium Chloride

Action and Use.—Sodium chloride is a very effective saline diuretic. Saline diuretics may act

by osmosis by means of hypertonic sodium chloride solutions. They are generally more potent diuretics than the isotonic sodium chloride solutions. When a concentrated salt enters the blood vessels, fluid passes into them from the surrounding tissues until the blood stream again becomes isotonic, increasing the circulating blood volume and thus producing a diuretic effect.

Sodium chloride causes a copious flow of urine, thus promoting excretion of toxic matter. Isotonic sodium chloride solution increases blood volume and thus promotes the flow of large amounts of urine through the kidneys. It is also used to remedy conditions resulting from loss of sodium chloride such as heat stroke, or loss of blood by hemorrhage or surgery. It is administered to prevent dehydration in burns, sometimes in failure of gastric secretion, and occasionally to raise the blood pressure in hypotension.

In general the sodium chloride solutions are not employed in treatment of edematous conditions. Sodium chloride is usually employed in therapeutics in the form of isotonic sodium chloride (Normal Saline Solution) solution of 0.90% sodium chloride, or in various hypertonic solutions.

Dose Usual: Oral, 1 gram 3 times a day
Parenteral, as prescribed, based
upon needs of the patient

#### Ammonium Chloride

Action and Use.—Ammonium chloride is a powerful diuretic. In the liver it is converted to urea and leaves an excess of anion in the extracellular fluid. Too large a dose may cause severe acidosis. It is generally given in the form of enteric-coated tablets to prevent irritation of the gastrointestinal tract, and it is used in conjunction with mercurial diuretics.

Dose Usual: Oral, 1 gram 4 times a day Dose Range: 300 mg. to 2 grams

#### Potassium Chloride

Action and Use.—The kidney rejects potassium readily, and if an excess of its salts is administered by mouth it is rapidly excreted so that it is difficult to detect any change in the blood concentration. This action of the kidney may be the basis for the diuretic action of some potassium salts. Large quantities of water are eliminated along with the salt. Like ammonium chloride the oral adminis-

tration of this salt is usually by means of entericcoated tablets.

Dose Usual: Oral, 1 gram up to 6 times a day

#### Potassium Citrate

Action and Use.—The action and uses as a diuretic are similar to potassium chloride. It has many other uses in therapeutics and will be discussed under different therapeutic class headings.

Dose Usual: 1 gram

#### Potassium Acetate

Action and Use.—The action and uses as a diuretic are similar to potassium chloride.

Dose Usual: 1 gram

# Mercurophylline Injection (Mercuzanthin®)

Action and Use.—Mercurials are powerful and effective diuretics, acting by tubular reabsorption of water. Dissociation of the organic mercurial complexes probably accounts for their effect on the kidney. The diuretic effects of the organic mercurials seem to be increased by the addition of theophylline and, at the present, almost all of the mercurial diuretics to be used for injection are combined with theophylline. Diuretics administered intramuscularly are used in the treatment of cardiac edema, sometimes in chronic nephrosis and ascites due to diseased liver. Mercurials are often given in conjunction with ammonium chloride.

NOTE: Renal insufficiency is an outstanding contraindication to the use of the mercurial diuretics, e.g., acute nephritis.

Dose Usual: I.M., 135 mg. (in 1 ml.) once or twice a week

Oral, 200 mg. daily

Dose Range: I.M., 65 to 270 mg. Oral, 100 to 200 mg.

# Meralluride Injection (Mercuhydrin®)

Action and Use.—Meralluride is used as a mercurial diuretic in the treatment of edema associated with cardiorenal disease or nephroses. Its uses and cautions are similar to those of mercurophylline injection.

Dose Usual: Parenteral, 1 ml. (equivalent to 39 mg. of mercury and 48 mg. of theophylline) once or twice a week.

Dose Range: 1 to 2 ml.

#### Mersalyl

Action and Use.—It is believed that mersalyl is less toxic and more active than the purine-free mercurial diuretics. The presence of theophylline increases the rate and completeness of absorption. It is used to remove excess fluid in edema of congestive heart failure, nephrosis and cirrhosis of the liver.

Dose Usual: I.V. or I.M., 100 mg. (1½ grains) once or twice a week Oral, 160 mg. (mersalyl) daily Dose Range: I.V. 100 to 200 mg.

Oral, 80 mg. to 160 mg.

Chlormerodrin (Neohydrin®)

Action and Use.—Chlormerodrin is used in treatment of cardiac and nephrotic edema, and ascites. It is one of the new mercurials which can be administered orally.

Dose Recommended: 55 to 110 mg. daily

Mercaptomerin Sodium (Thiomerin Sodium®)

Action and Use.—The action of mercaptomerin sodium is similar to the other mercurial diuretics but it has the advantage of producing very little irritation at the site of injection. This drug is thermolabile and should be stored in a cool place.

Dose Usual: Parenteral, 130 mg. (in 1 ml.) once or twice a week

Dose Range: 26 to 260 mg.

# Chlorothiazide (Diuril®)

Action and Use.—Chlorthiazide is a new diuretic developed for use in control of edematous conditions. It is an exceptionally potent, orally effective, nonmercurial agent with diuretic activity equivalent to that of the parenteral mercurials. Its mechanism of action is based upon the fact that it is a carbonic anhydrase inhibitor and it promotes the elimination of both sodium and chloride from the body via the tubules of the kidney. Excretion of bicarbonate is minimal and excessive loss of potassium does not occur in appropriate therapeutic doses.

Chlorothiazide is well tolerated. Gastrointestinal symptoms such as nausea, vomiting, and diarrhea are relatively infrequent. The onset of action is rapid (within 2 hours) and its major effect is complete within 6 to 12 hours. The diuretic effectiveness does not decrease with repeated daily

administration. It is used in all types of congestive heart failure in which diuretic therapy is required, in various forms of renal edema, hepatic edema, and is a useful adjunct in the edema and toxemia of pregnancy. It is also useful in druginduced edema due to certain drugs as ACTH and cortisone, and is of value in treating obesity in which fluid retention is a complicating factor.

Chlorothiazide is of value in the management of hypertension. Its main effect appears to be potentiation of antihypertensive drugs such as reserpine, hydralazine, and ganglionic blocking agents.

CAUTION: As with other potent diuretics, the patient must be carefully and regularly observed for early signs of fluid and electrolyte imbalance such as thirst, weakness, lethargy, muscle cramps, hypotension, gastrointestinal disturbances, and tachycardia.

Dose Recommended: 0.5 gram once or twice a day at an interval of 6 to 12 hours

Dose Range: 0.5 to 1.0 gram once or twice a day at an interval of 6 to 12 hours

Hydrochlorothiazide (Esidrix®, HydroDiuril®)

Action and Use.—Hydrochlorothiazide is an improved analog of chlorothiazide and is approximately 10 times more active.

Dose Recommended: For edema, 50 to 100 mg.
once or twice daily
For hypertension, 50 mg.

once or twice daily

Dextrose (d-Glucose)

Action and Use.—As a diuretic, dextrose is usually employed as a hypertonic solution intravenously. It is also used in isotonic solutions as a nutritive, and in combination with saline solution to combat circulatory failure due to hemorrhage or shock.

Dose Range: 5%, 250 to  $1{,}000$  ml. 50%, 20 to 100 ml.

Sucrose

Action and Use.—As a diuretic, sucrose is administered intravenously. It must be used with caution as it may cause severe renal injury. It has an advantage over dextrose in that it is not metabolized when given intravenously, whereas dextrose is a natural sugar of the body and some

of it may be deposited as glycogen in the liver. Sucrose is also used orally as a nutritive and in pharmacy as a sweetening agent and an excipient for pills, masses and troches.

#### Theophylline

Action and Use.—This drug is used as a diuretic in treatment of edema, cardiac edema and nephritis. It is considered a milder diuretic as contrasted to the mercurial diuretics, Its diuretic action may decrease considerably after several days usage and other diuretics may have to be administered. Gastrointestinal irritation is a common side effect.

Dose Usual: 0.2 gram (3 grains)

Theobromine Sodium Salicylate

Action and Use.—Its action and use are similar to the ophylline.

Dose Usual: 1 gram (15 grains)

Theobromine Calcium Salicylate (Theocalcin®)

Action and Use.—This drug is given in place of theobromine sodium salicylate when the sodium ion is containdicated.

Dose Usual: 0.5 gram (7½ grains)

Aminophylline (Theophylline Ethylenediamine)

Action and Use.—Its action and use as a diuretic are similar to theophylline. It may cause gastric upset and vomiting.

Dose Usual: Oral, 0.2 gram (3 grains) 3 times a day

I.V., 0.5 gram (7½ grains) 3 times a day

Rectal, 0.5 gram up to twice a day

Dose Range: Oral, 0.1 to 0.2 gram I.V., 0.25 to 0.5 gram Rectal, 0.25 to 0.5 gram

Urea

Action and Use.—Urea is a very active diuretic which is used in the treatment of cardiac edema and chronic nephrosis. It is administered with fruit juices, iced drinks, or flavored syrups to mask its taste. It is also used topically in treatment of infected wounds as it aids in the removal of necrotic tissue and has some antiseptic value.

Dose Usual: 8 grams (120 grains) 1 to 5 times daily

Dose Range: 8 to 40 grams

## Acetazolamide (Diamox®)

Action and Use.—This is a relatively new diuretic which inhibits the enzyme carbonic anhydrase, resulting in an increased excretion of bicarbonate, sodium, potassium and water. The urine is usually alkaline. It produces no gastric upset and is effective upon oral administration since it is absorbed from the gastrointestinal tract. Acetazolamide is useful as an adjunctive therapy for control of edema in patients with congestive heart failure. It has no value in treatment of nephritic conditions. It appears to have therapeutic value in glaucoma.

Dose Recommended: Oral, 0.25 gram to 0.5 gram, once daily

## Carbacrylamine Resins (Carbo-Resin®)

Action and Use.—Ion exchange resins have been used in industry for a long time to remove unwanted substances. This principle has now been applied in therapeutics. The resins interfere with the absorption of sodium and promote its elimination through the gastrointestinal tract, thus causing loss of edema fluid. Other ions such as calcium may be absorbed; therefore, this drug must be administered with caution. Excessive loss of sodium ions may cause an acidosis. To prevent loss of potassium ions, part of the resin is a potassium salt. It is used in the treatment of patients with edema, cardiac failure, liver disease, and in kidney diseases wherein sodium is not excreted in normal amounts. It is often used in conjunction with mercurial diuretics; however, in long-term therapy, supplementary calcium should be given to prevent disturbances in calcium metabolism.

Dose Recommended: 16 grams mixed with water.

### **ACIDS**

Acids may be classified as organic and inorganic. The aqueous acids may also be classified as strong or weak, according to their degree of ionization. Strong acids include hydrochloric, sulfuric, and nitric; weak acids include hydriodic, boric, and the organic acids. The strong inorganic acids are known as mineral acids and are highly corrosive.

The official concentrated acids are not of uniform strength, but the official diluted acids have a uniform strength of 10 percent, with the exception of diluted acetic acid which is 6 percent.

Toxicology.—The most corrosive of the mineral acids are sulfuric and nitric. Hydrochloric and phosphoric acids are less corrosive, but they all rapidly destroy organic tissue. Detection of acid poisoning may be aided by the stains produced upon the body or clothing. Sulfuric acid removes water from tissue and blackens organic matter (carbonization). Nitric acid stains a deep yellow.

The general symptoms of poisoning by mineral acids are similar; intense pain in the mouth, esophagus, and stomach; severe vomiting (with sulfuric acid, the vomitus may be black or tarry); diarrhea; rapid weak pulse, shallow respiration, subnormal temperature; possible ensuing shock. Death from collapse may occur in a few hours. The mind is usually clear until the end nears, when there may also occur a suppression of urine and failure of voice.

Treatment is as follows:

- 1. Immediately neutralize the acid with a nontoxic alkali such as milk of magnesia or magnesium oxide.
- 2. Do not give any alkali carbonates, as the carbon dioxide gas may blow up the stomach and damage stomach walls. Do not give bicarbonates.
- 3. Do not give an emetic or put down a stomach tube as you may further damage the stomach walls.
- 4. Give soothing demulcents such as starch, egg white, or milk.
- 5. The patient should then receive symptomatic treatment.

#### Hydrochloric Acid

Action and Use.—Official diluted hydrochloric acid is employed in the treatment of achlorhydria and hypochlorhydria. The acid should be diluted with water and sipped through a glass straw to prevent a solvent reaction upon the dental enamel.

NOTE: Technical hydrochloric acid is the muriatic acid of commerce. It contains impurities such as ferric chloride and organic matter, which gives it a yellow color. This form of hydrochloric acid must not be confused with the official acid as it is unfit for medicinal use:

Dose Usual: Diluted hydrochloric acid, 4 ml. (1 fluidram)

#### Glutamic Acid Hydrochloride

Action and Use.—The uses of glutamic acid hydrochloride are those of hydrochloric acid in

treatment of achlorhydria due to pernicious anemia, hypochlorhydria, or other causes.

Dose Usual: As capsules, 1 gram (15 grains)

#### Nitric Acid

Action and Use.—Nitric acid is a fuming liquid, very caustic, having a characteristic, highly irritating odor, containing 67 to 71 percent of nitric acid and is rarely used internally. Nitric acid is highly escharotic and sometimes is employed for the removal of warts and also as a cauterizing agent.

#### Sulfuric Acid (Oil of Vitriol)

Action and Use.—Sulfuric acid is a colorless, odorless, liquid of oily consistency, very caustic and corrosive. Its uses are chiefly pharmaceutical and chemical.

#### Phosphoric Acid

Action and Use.—Phosphoric acid is a colorless, odorless liquid of a syrupy consistency. Its uses are chiefly pharmaceutical and chemical.

#### Glacial Acetic Acid

Action and Use.—Glacial acetic acid is a clear. colorless liquid with a pungent, characteristic odor which when well diluted with water has an acid taste. It is miscible with water, alcohol, and glycerin, and contains about 99 percent of acetic acid. It is very irritating to the skin sometimes causing blistering, but it destroys only the most superficial layers. Sometimes it is used as an escharotic to remove warts and callouses. Taken internally, it produces some of the irritating effects of the corrosive acids. Diluted to 36 percent (acetic acid), it is used in pharmacy as a solvent and menstruum, and for making diluted acetic acid. Diluted to 6 percent strength it is similar to vinegar and, when applied to the skin, has a cooling effect and slight astringent action, and checks excessive local perspiration. It is sometimes used as an antidote in caustic alkali poisoning.

Dose Recommended: Diluted Acetic Acid (6%), 2 ml. (30 min.)

#### Lactic Acid

Action and Use.—Lactic acid is a clear, colorless, syrupy liquid which is used as a spermatocide. It is also used in baby milk formulas.

#### Trichloroacetic Acid

Action and Use.—Trichloroacetic acid occurs as colorless crystals. It is strongly caustic, and is used primarily in removal of warts, moles, and callouses. It is largely replacing glacial acetic acid for this purpose.

#### ANTACIDS

Antacids are drugs used to counteract too much acid in the stomach or to correct a low alkalinity in body fluids. Normally there is a certain degree of acidity in the stomach. The stomach contents may become too highly acid, irritate the mucous membrane, and cause symptoms commonly spoken of as indigestion or dyspepsia. Antacids such as sodium bicarbonate, magnesium oxide, magnesium carbonate, or milk of magnesia are indicated in this condition. The intestinal tract is normally slightly alkaline. As a result of disease it may become acid, which condition usually causes diarrhea.

# Aluminum Hydroxide Gel (Colloidal Aluminum Hydroxide)

Action and Use.—Aluminum hydroxide gel is a white, viscous suspension used in treatment of gastric hyperacidity and peptic ulcer, and of intestinal toxemia as an adsorbent for toxins, gases, or bacteria. It also acts as a protective and demulcent, and is so employed in treatment of inflamed areas of the gastrointestinal tract. Aluminum hydroxide sometimes causes constipation.

Dose Usual: 8 ml. (2 fluidrams) 4 times a day Dose Range: 4 to 30 ml.

#### Dried Aluminum Hydroxide Gel

Action and Use.—This drug has the same therapeutic action and uses as the suspension.

Dose Usual: 0.3 gram, 4 times a day Dose Range: 0.3 gram to 2.4 grams

#### Aluminum Phosphate Gel

Action and Use.—Aluminum phosphate gel is used as a gastric antacid and demulcent in the treatment of peptic ulcer, particularly when associated with diarrhea, low phosphorus level, or deficiency of pancreatic juice. It has less acid combining power than aluminum hydroxide gel.

Dose Usual: 15 ml. 6 times a day Dose Range: 15 to 30 ml.

## Magnesium Trisilicate

Action and Use.—Magnesium trisilicate is an antacid, and also an effective adsorbent. It is used in the treatment of peptic ulcer.

Dose Usual: 1 gram (15 grains) 4 times a day Dose Range: 1 to 4 grams

## Magnesium Oxide

Action and Use.—Magnesium oxide is a very white bulky powder, identical chemically with heavy magnesium oxide, U.S.P. It is an excellent gastric antacid. In large doses it is a laxative.

Dose Usual: Antacid, 0.25 gram (4 grains); as cathartic, 4 grams (60 grains)

# Magnesia Magma (Milk of Magnesia)

Action and Use.—Magnesia magma is a suspension of magnesium hydroxide containing 7 to 8.5 percent of Mg(OH)<sup>2</sup>. The U.S.P. permits use of a suitable flavoring to make this preparation more palatable. The therapeutic uses for magnesia magma are the same as for magnesium oxide.

Dose Usual: Antacid, 4 ml. (1 fluidram); laxative, 15 ml. (4 fluidrams)

Dose Range: 4 to 30 ml.

#### Sodium Bicarbonate

Action and Use.—Sodium bicarbonate is a white crystalline powder which is stable in dry air but slowly decomposes in moist air. It is used in the treatment of hyperacidity of the stomach and urine. Weak solutions are used frequently as irrigants and washes.

Dose Usual: 2 grams (30 grains) up to 4 times a day

Dose Range: 1 to 4 grams

CAUTION: Heat should not be used to dissolve sodium bicarbonate as this will cause the bicarbonate to change to carbonate which will produce a local irritant effect similar to that of the caustic alkalis.

#### Calcium Hydroxide

Action and Use.—Calcium hydroxide is a soft, white crystalline powder with an alkaline, slightly bitter, taste. It is rarely used medicinally, but is employed to make the official solution of calcium hydroxide.

Calcium Hydroxide Solution (Lime Water)

Action and Use.—This solution is a weak antacid which is used frequently in babies' formulas to insure adequate calcium intake.

Dose Recommended: 15 ml. (4 fluidrams)

# Precipitated Calcium Carbonate

Action and Use.—Precipitated calcium carbonate is a fine, white, microcrystalline powder, odorless and tasteless, which is employed as a gastric antacid in hyperchlorhydria and diarrhea. It is also used as a basic powder in dentifrices.

Dose Usual: 1 gram (15 grains) 4 times a day Dose Range: 1 to 2 grams

# Sodium and Potassium Hydroxide (Lye)

Action and Use.—Oxides and hydroxides neutralize acids and dissolve proteins, and in a lesser degree combine with fats. While acids simply kill tissue, caustic alkalis actually dissolve it, producing an effect both quicker and deeper. Since caustic alkalis produce such local irritation, they are not generally used as antacids.

Toxicology.—Caustic alkalis are most commonly used as cleaning agents and most cases of poisoning result from the careless practice of leaving lye solutions in familiar containers. Symptoms are pain in the throat and epigastrium, with nausea and vomiting. The vomitus may be dark brown, due to the presence of decomposed blood. The mucous membrane of the mouth is slippery and swollen, often brownish in color. In severe cases, shock may ensue. If the patient survives, a stricture of the esophagus, due to the local caustic action, may develop.

Treatment.—Treatment is as follows:

- 1. Neutralize the alkali. Give diluted acetic acid, vinegar, two tablespoonsful of vinegar in a half glass of water. As a substitute, lemon juice or well diluted mineral acids may be used.
- 2. Olive oil or other fixed oils are effective as demulcents.
- 3. Do not use a stomach tube or emetic. After neutralization of the alkali, treat the patient symptomatically.

# DIGESTANTS

Digestants are drugs which promote the process of digestion. Their use is limited to replacing

certain substances which may be lacking for proper digestion. Hydrochloric acid, the enzymes of the stomach, pancreas, and bile are digestants.

#### Pancreatin

Action and Use.—Pancreatin is a cream-colored powder which contains enzymes, principally pancreatic amylase, trypsin, and pancreatic lipase. It is used in the treatment of various forms of digestive failure. It is capable of digesting fats, proteins, and carbohydrates. The enzyme amylase acts upon carbohydrates, trypsin upon protein, and lipase upon fats.

Dose Usual: 0.5 gram (7½ grains)

# Pepsin

Action and Use.—Pepsin occurs as lustrous, transparent yellow scales and is obtained from the fresh stomach of the hog. Pepsin is a normal enzyme of the stomach, necessary for the breaking down of protein. It is active only in a slightly acid medium. The hydrochloric acid in the stomach supplies the necessary acid medium for the pepsin and also activates the pepsinogen to form pepsin. It is used in combination with dilute hydrochloric acid in gastric achylia and occasionally as a digestant. It is also used in the form of elixirs as a vehicle in pharmacy.

Dose Usual: 0.5 gram (7½ grains)

#### Ox Bile Extract

Action and Use.—Ox bile extract is a brownishvellow, greenish-yellow, or brown powder, having a bitter taste. Bile is essential for the normal digestion of fats. The normal constituents of bile are the bile salts, sodium glycocholate and sodium taurocholate; the bile pigments, bilirubin and biliverdin; cholesterol and lecithin. Of these, the most important are the bile salts, which are necessary for the absorption of fats and certain fat soluble vitamins, K, D, A and carotene. Bile salts stimulate the flow of bile and also have a stimulating effect on the intestinal musculature, producing a catharsis. Parenteral administration produces a greater intestinal stimulation than oral administration.

Ox bile extract is used as a choleretic; to promote absorption of vitamin K; in treatment of hepatic insufficiency, hepatic jaundice and cirrhosis of the liver.

Dose Usual: 0.3 gram (5 grains)

#### Dehydrocholic Acid

Action and Use.—It is similar to ox bile extract and is available in tablet form and, as sodium dehydrocholate, as injection.

Dose Usual: Oral, or tablet, 500 mg. 3 times a day

Dose Range: 250 to 500 mg.

Dose Recommended: Injection, I.V., sodium dehydrocholate, 2.0 grams (30 grains)

#### STOMACHICS

Stomachics are drugs which improve the appetite and digestion. They act by stimulating the flow of hydrochloric acid and digestive juices in the stomach. They will be considered in two groups, bitters and aromatics. Bitters are drugs whose effects are due largely to their bitter taste and whose action is probably, in large measure, a reflex from stimulation of the gustatory (taste) nerves. Probably they also exert a mild irritant effect on the gustatory nerves and on the mucous membrane of the stomach which further excites the gastric glands. Since the action of these drugs is due to their bitterness, any bitter substance that is not too active physiologically may have the same Nux vomica and cinchona, considered elsewhere, are frequently used as bitters.

The aromatics considered here have both stomachic and carminative properties. An aromatic is a drug of a spicy fragrance, used to stimulate the appetite and digestive secretion. A carminative is a drug used to relieve flatulence (gas). The action of these drugs depends upon the volatile oil present. As aromatics they cause slight irritation of the gastric mucosa; as carminatives they tend to promote peristalsis by irritating the intestinal tract, thereby causing expulsion of gas. A number of substances considered elsewhere, such as camphor, chloroform, and turpentine, are also employed as carminatives.

#### Gentian

Action and Use.—Gentian has been in use for centuries and is still one of the most popular bitters. Its value is increased by its lack of toxic properties. It is usually prescribed in form of compound tincture.

Dose Usual: As a compound tincture, 4 ml. (1 fluidram)

#### Cardamom Seed

Action and Use.—Cardamom is not as stimulating as other aromatics and is frequently used as an adjuvant to other carminative drugs or as a flavoring agent. It is usually prescribed as compound cardamom tincture.

Dose Recommended: 4 ml. (1 fluidram)

#### Cinnamon Oil

Action and Use.—Cinnamon is an efficient aromatic and carminative, with mild action on the stomach and intestines. It is often employed as an adjuvant for flavoring purposes.

Dose Recommended: As cinnamon oil, 0.1 ml. (1½ min.)

Dose Recommended: As cinnamon spirit, 1 ml. (15 min.)

# Peppermint Oil

Action and Use.—Peppermint oil is an excellent gastrointestinal stimulant, being useful in flatulence and nausea. It is also frequently used as a flavoring agent.

Dose Usual: As peppermint spirit, 1 ml. (15 min.) 3 times a day

Dose Range: Up to 1 ml.

#### Menthol

Action and Use.—Menthol has a cooling effect when applied locally. It also depresses certain sensory nerves producing a local anesthetic effect. Because of its slight antiseptic and anesthetic effect, it is used to relieve itching in certain skin afflictions and also in nasal sprays in the treatment of coryza, pharyngitis, and laryngitis.

Dose Usual: Topical, as 1 to 10% in preparations for use on the skin

## CATHARTICS

Cathartics are drugs which promote evacuation of the bowels. They are used primarily to empty the colon as in the treatment of simple constipation, and to rid the intestine of any irritant or toxic substance as in enteritis.

Cathartics may be classified—

1. According to their intensity of action, as aperients, laxatives, purgatives, hydragogues, and drastics. Cholagogues may be included here, as some promote defecation by stimulating the flow of bile.

2. According to their mechanism of action, as irritant cathartics, saline cathartics, bulk cathartics, and emollient cathartics.

# Cascara Sagrada

Action and Use.—Cascara sagrada is the dried bark of *Rhamnus purshiana*; its taste is bitter and acrid. The bark should not be used for a year after it is collected as it contains an irritant ferment when fresh which may cause severe griping. Cascara sagrada is the most popular of the emodin cathartics. Its action is mild and unaccompanied by discomfort. It may be prescribed as follows:

Dose Usual: As extract, 0.3 gram (5 grains)
As fluidextract, 1 ml. (15 min.)
As aromatic fluidextract, 2 ml. (30 min.)
As tablets, 0.3 gram (5 grains)

## Podophyllum

Action and Use.—Podophyllum is a powerful irritant, even when applied to the skin. Small amounts of the drug produce copious, soft stools, usually accompanied by marked intestinal irritation. Larger doses cause watery stools tinged with blood. The crude drug podophyllum is seldom used as a cathartic being replaced by the official resin of podophyllum.

#### Podophyllum Resin

Action and Use.—Podophyllum resin produces watery stools, causes considerable griping, and is capable of setting up a gastroenteritis violent enough to threaten life. It is too severe to be used alone, but is frequently combined with milder cathartics to increase their action in the treatment of obstinate constipation. It is sometimes used in the treatment of dropsy to evacuate the fluid. It is a useful cathartic where evacuation of the small intestines is essential as in certain food poisoning.

Resin podophyllum has been shown by clinical trials to be effective in the treatment and removal of venereal warts. The application of a mineral oil suspension of the resin to the growth results in shrinking within a few hours, a noticeable decrease in size within two days.

CAUTION: Exposure to dust of this resin may produce severe conjunctivitis and keratitis.

Dose Recommended: 1/8 to 1/4 grain

## Castor Oil

Action and Use.—Castor oil is a pale yellowish or almost colorless, viscid liquid with a faint, mild odor and a bland, usually nauseating, taste. Its cathartic action is due to the presence of a fatty acid, ricinoleic acid, which in the intestinal tract forms ricinoleates. The local irritant action of the ricinoleates are responsible for catharsis. Castor oil is bland and nonirritating, and is sometimes used as an emollient for the skin or the eye. It is a useful cathartic where evacuation of the small intestine is essential as in certain food poisons.

Dose Usual: 15 ml. (4 fluidrams) Dose Range: 15 ml. to 60 ml.

# Phenolphthalein

Action and Use.—Phenolphthalein occurs as a white or faintly yellowish white crystalline powder. It acts both by its local irritant effect on the intestinal tract and by direct motor stimulation of the intestines. The greatest effect is produced on the colon, although there is some action in the small intestine. The cathartic action is not accompanied by any griping or colic. As it is tasteless and odorless, it is a pleasant cathartic to take and is an ingredient in many of the proprietary preparations, a number of which are made in the form of candy, or gum.

Dose Usual: 60 mg. (1 grain) Dose Range: 30 to 60 mg.

# Magnesium Sulfate (Epsom Salt)

Action and Use.-Magnesium sulfate occurs as small, colorless crystals, usually needle-like, and has a cooling saline and bitter taste. The action of all the saline cathartics is identical. They are absorbed slowly, and thus are retained in the intestinal tract for a comparatively long period. The intestinal wall acts as a semipermeable membrane between the intestinal contents and circulation, and fluid passes between the circulation and the intestinal tract until the solution of the saline cathartic is rendered isotonic with the body fluids: Therefore, if large amounts of the salt are taken, the volume of water retained in the intestinal tract is considerable and exerts a mechanical stimulus which increases peristalsis. The contents of the colon remain liquid and are rapidly expelled. Since the action of the salines removes a considable amount of water from circulation, hypertonic solutions of certain cathartic salts may be given solely for their dehydrating effect. When salines are used for catharsis, sufficient water should be administered by mouth to avoid loss of water.

Dose Usual: 15 grams (4 drams) Dose Range: 10 to 30 grams

# Magnesium Citrate Solution

Action and Use.—Magnesium citrate solution is a pleasantly flavored cathartic prepared by the reaction between magnesium carbonate and citric acid, producing an effervescent solution.

Dose Usual: 200 ml. (7 fluid oz.)

#### Sodium Sulfate

Action and Use.—Sodium sulfate is a very efficient cathartic, equal in effectiveness to Epsom salt and superior in not being toxic after absorption, but its taste makes it the most objectionable of the saline cathartics.

Dose Usual: 15 grams (4 drams)

# Sodium Phosphate

Action and Use.—Sodium phosphate is a color-less or white granular salt. It is the most pleasant of the saline cathartics, and has a mild action.

Dose Usual: 4 grams (1 dram)

#### Potassium Sodium Tartrate (Rochelle Salt)

Action and Use.—Potassium sodium tartrate may be described as colorless crystals or white, crystalline powder, with a cooling, saline taste. It is a rather mild, pleasant cathartic. It is an ingredient in Seidlitz powders.

Dose Usual: 10 grams

#### Compound Effervescent Powders (Seidlitz Powders)

Action and Use.—Administration of these powders produces an effective cathartic action. A Seidlitz powder consists of two powders, one wrapped in white paper, and the other wrapped in blue paper. When administered, the contents of the two powders are dissolved separately, each in half a glass of water, and then poured together and taken while effervescing.

Dose Usual: Contents of white and blue paper each dissolved in 60 ml. of water separately.

Agar

Action and Use.—Agar is administered internally as a laxative to give moisture and bulk to the intestinal contents in chronic constipation. It may be administered alone, cut into small pieces and eaten as a cereal with cream and sugar, or combined with a drug such as cascara sagrada to increase the cathartic action. Agar is also used as a culture medium for bacteriologic work.

Dose Usual: 4 grams (1 dram) once or twice a day

Dose Range: 4 to 16 grams

Methylcellulose

Action and Use.—Methylcellulose is a white fibrous material. It dissolves in cold water to form a clear jelly which coagulates on heating and redissolves on cooling. It is not toxic and is not absorbed from the digestive tract. Methylcellulose is used as a hydrophyllic laxative.

Dose Usual: 1 gram with water, 1 to 4 times daily

Dose Range: 1 to 4 grams

Liquid Petrolatum (Mineral Oil)

Action and Use.—Mineral oil is an excellent lubricant as it is indigestible and unabsorbable. It also emulsifies with the feces, prevents loss of water from the intestines, and thus increases bulk of the fecal masses. If large doses are taken, the oil may leak through the anus. This may be prevented by decreasing the dose or by administering fractions of the dose at intervals during the day. It is also available in emulsion and as light liquid petrolatum.

Dose Usual: 15 ml. (4 fluidrams) once or twice a day

As emulsion, 30 ml.

Dose Range: 15 to 30 ml.

Psyllium Hydrophilic Mucilloid (Metamucil)

Action and Use.—This drug is used as an adjunct in the treatment of constipation. It forms a soft, gelatinous residue in the lower bowel.

Dose Usual: 4 to 7 grams, 1 to 3 times daily, thoroughly stirred in a suitable liquid

Phenolphthalein in Liquid Petrolatum Emulsion

Action and Use.—The lubricant action of heavy

liquid petrolatum is fortified with the addition of phenolphthalein.

Dose Usual: 15 ml. (4 fluidrams)

### **EMETICS**

Emetics are drugs which cause vomiting either by direct stimulation of the vomiting center in the medulla, or by irritant action on the oropharyngeal and gastrointestinal tracts. Emetics are used to evacuate irritant or toxic substances from the stomach. Because of their tendency to increase bronchial secretions, some are also used as expectorants.

Certain drugs such as mustard, zinc sulfate, and copper sulfate are useful as emetics because of their irritant action (see Review of Toxicology, this chapter). They are discussed more completely elsewhere under their more important therapeutic uses.

# Apomorphine Hydrochloride

Action and Use.—This drug is the hydrochloride of an alkaloid prepared from morphine. It is odorless. Apomorphine produces emesis by stimulation of the vomiting center in the medulla. It is most effective when given parenterally. Vomiting usually occurs within 10 to 15 minutes after administration, preceded by nausea and salivation. Care must be taken not to give an overdose as it has a central nervous system depressant effect and may produce collapse or death. In small doses, about 1/16 grain, apomorphine may be used as an expectorant in the treatment of bronchitis.

CAUTION: Solutions turning a green color should be rejected.

Dose Usual: Subcutaneous, 5 mg. (1/12 grain)

pecac

Action and Use.—Ipecac contains two important alkaloids—emetine, cephaeline. Cephaeline is most irritating, producing nausea and vomiting. Emetine is somewhat irritating and is capable of producing nausea, but its chief use is as an amebicide. Ipecac is rather slow in its emetic action, requiring from 30 minutes to an hour to take effect, and is usually prescribed as ipecac fluidextract or ipecac syrup. It is sometimes used as an expectorant and a diaphoretic.

Dose Usual: Fluidextract, as emetic, 0.5 ml. (8 min.)

Syrup, as emetic, 8 ml. (2 fluidrams)

Dose Range: Fluidextract, 0.5 to 1.0 ml. Syrup, up to 8 ml.

# **EXPECTORANTS**

Expectorants are drugs which are used to increase bronchial secretions and facilitate the expulsion of sputum. They are generally used in the treatment of coughs. Expectorants may be divided into two classifications: sedative or stimulating. Sedative expectorants tend to soothe acute inflammatory conditions and to increase secretions of mucus, while stimulating expectorants tend to decrease secretions of mucus and stimulate repair in chronic inflammatory conditions of the respiratory tract.

Expectorant Vehicles.—Vehicles used for expectorants include wild cherry syrup, orange syrup, cherry syrup, tolu balsam syrup, citric acid syrup, and raspberry syrup.

#### Ammonium Chloride

Action and Use.—This drug increases the secretion of mucus thereby protecting the irritated mucous membranes and diminishing the amount of coughing. It is generally incorporated into a vehicle such as Brown Mixture and may be administered in capsule form. It has a strong saline taste and is considered an excellent expectorant. It is also used as a systemic acidifier and as a diuretic.

Dose Recommended: As expectorant, 0.3 gram Dose Range: 300 mg. to 2 grams

## Ammonium Carbonate

Action and Use.—Taken orally, ammonium carbonate is an irritant and causes gastritis in overdose. It is generally administered in an alkaline vehicle. It is a sedative expectorant in the treatment of bronchitis. Ammonium carbonate is an ingredient of smelling salts and aromatic ammonia spirit, used for the relief of fainting spells and nausea.

Toxicology.—In poisoning by ammonia, the symptoms show some variations. Because of the volatility of the drug, there may be irritation of the respiratory tract as well as of the alimentary canal. In some patients this may be so intense as to cause edema of the glottis, resulting in

suffocation. When this occurs, immediate tracheotomy is necessary to prevent death.

Dose Usual: 300 mg. in dilute solution Dose Range: Up to 300 mg.

# Antimony Potassium Tartrate (Tartar Emetic)

Action and Use.—Antimony salts are powerful emetics, chiefly because of their action on the gastrointestinal mucosa which produce nausea and sometimes severe vomiting. Tartar emetic is far too dangerous to prescribe as an emetic or to be used alone. It can be used as an expectorant in small doses and in combination with other drugs as in Brown Mixture.

The mechanism by which antimony compounds cure leishmaniasis is unknown; it does not seem to be the result of a direct action on the parasites. However, in some forms of leishmaniasis (Kalazar) and schistosomiasis (Schistosoma japonicum) antimony potassium tartrate provides effective treatment.

Dose Usual: For certain tropical diseases, I.V. 40 mg. as 0.5% solution 3 times a

Dose Range: 20 to 100 mg.

# Sodium lodide.

Action and Use.—The iodides; sodium and potassium, increase bronchial secretions. They tend to loosen the sputum and are therefore classified as sedative expectorants. They are generally incorporated into cough mixtures and administered in this manner.

Dose Usual: 0.3 gram (5 grains) 3 times daily Dose Range: 0.3 gram to 1.0 gram

#### Terpin Hydrate Elixir

Action and Use.—This preparation is a hydroalcoholic, sweetened preparation consisting of terpin hydrate as the active ingredient. It is an expectorant causing a decrease in secretions of mucus. Codeine sulfate, one grain to the fluid ounce, is sometimes added for a sedative effect. This preparation is called Terpin Hydrate and Codeine Elixir.

Dose Usual: 4 ml.

# Compound Benzoin Tincture

Action and Use.—Benzoin in the form of its preparations is used as an expectorant inhalant for

various bronchitic conditions. Externally it is used as an antiseptic and protective to promote healing.

Dose Recommended: As inhalant, 4 ml. to pint of hot water

# Tolu Balsam Syrup

Action and Use.—Tolu Balsam is a feeble stimulating expectorant and is used as a vehicle in many cough medicines.

Dose Recommended: 4 ml.

Compound Opium and Glycyrrhiza Mixture (Brown Mixture)

Action and Use.—This is commonly employed in the Navy as an expectorant mixture. It contains antimony potassium tartrate, camphorated opium tincture, and ethyl nitrite spirit. Ammonium chloride 0.3 gram per 4 ml. is sometimes added to increase the expectorant effect.

Dose Usual: 4 ml.

# **DEMULCENTS**

Demulcents are bland substances which form gummy or mucilaginous solutions in water and exert a soothing effect on inflamed mucous membranes and protect them from irritants. They are usually employed in the forms of drinks or enemas. Occasionally, they are used in the treatment of inflamed throat conditions as lozenges or gargles.

#### Acacia

Action and Use.—Acacia is used as a demulcent in the treatment of certain forms of throat and mouth irritation. In pharmacy, it is used as an emulsifying agent and pill excipient. It is generally used in the form of acacia syrup or acacia mucilage.

#### Tragacanth

Action and Use.—Tragacanth differs from acacia in being insoluble in water, but it absorbs water and swells into a soft paste. This is due to a gummy principle called bassorin. Alcohol does not have as much precipitating power for tragacanth as for acacia. Tragacanth is occasionally used as a demulcent, but more commonly as an emulsifying agent and as an excipient in the manufacture of pills and troches.

Glycyrrhiza (Licorice Root)

Action and Use.—Glycyrrhiza is used in the form of extract or fluid extract as a demulcent and expectorant, and in pharmacy as a flavoring agent and pill excipient.

#### Gelatin

Action and Use.—This substance is produced by partial hydrolysis of collagen. It is derived from the skin, white connective tissue, and bones of animals, and occurs as white or yellowish sheets, shreds, flakes, or a coarse or fine powder. It has a very slight characteristic bouillon-like odor and taste; is stable in air when dry but subject to microbe decomposition when moist or in solution; is soluble in hot water but insoluble in cold water; and will absorb from 5 to 10 times its weight of water, swelling and softening.

# **EMOLLIENTS**

Emollients are bland, fatty or fatlike substances which, when applied to the skin, make it softer and more pliable and serve as protectives. They are especially useful when the skin has a tendency to crack or chap. They also soothe irritated skin. Some emollients, such as ointment bases, are used as vehicles to introduce drugs into the system through the skin. This method is used to administer drugs which are likely to irritate the alimentary tract. Disadvantages are the slowness of absorption and the uncertainty of dosage. When systemic effects are desired, medicated ointments should be thoroughly rubbed into the skin to insure adequate absorption. Ointment bases are also used for application of drugs in the treatment of skin diseases.

Certain substances, like petrolatum and glycerin that are not fats, are included in this group because they have emollient properties.

Many fatty substances may become rancid upon standing and be irritating to the skin. Care must be taken to store them properly.

#### Cottonseed Oil

Action and Use.—Cottonseed oil is used as an emollient and sometimes as a nutrient. It is employed in the manufacture of pharmaceutical preparations and as a cooking and salad oil.

#### Olive Oil

Action and Use. -- Olive oil is frequently used as

an emollient and as a mild laxative in chronic constipation. It is nutritive and is used in cooking.

Dose Recommended: 30 ml. (1 fluid ounce)

# Linseed Oil (Raw Linseed Oil)

Action and Use.—Raw linseed oil can be used as an emollient, but it is seldom used externally because of its drying property. It is used in pharmaceutical preparations and is sometimes employed as a laxative.

Dose Recommended: 30 ml. (1 fluid ounce)

# Theobroma Oil (Cocoa Butter)

Action and Use.—This oil is an excellent emollient in the treatment of chapped skin. It melts at body temperature and is therefore used as a suppository base.

# Wool Fat (Anhydrous Lanolin)

Action and Use.—Wool fat is used as an emollient. It is also an excellent ointment base, particularly when aqueous preparations are to be incorporated in the ointment. It is used to manufacture hydrous wool fat.

# Hydrous Wool Fat (Lanolin)

Action and Use.—Hydrous wool fat is wool fat containing 25 to 30 percent water. It is yellowish white and otherwise similar to anhydrous wool fat and used for the same purposes. Hydrous wool fat absorbs aqueous liquids up to twice its weight. It will not become rancid.

# Petrolatum

Action and Use.—Petrolatum is used as an emollient and lubricant. As an ointment base it has the advantage of not becoming rancid, but it is absorbed very slightly by the skin and therefore cannot be used as a vehicle for drugs which are to be administered by inunction.

#### White Petrolatum

Action and Use.—This is petrolatum which has been wholly or nearly decolorized. It is a white or faintly yellowish, unctuous mass and has the same uses as petrolatum.

#### Hydrophilic Ointment

Action and Use.—Hydrophilic ointment will permit the incorporation of additional water and is useful in making ointments and creams containing

aqueous solutions. Drugs incorporated into this ointment come in more intimate contact with the skin. It is easily removed by means of soap and water and is considerably less greasy than petrolatum or lanolin.

# Glycerin

Action and Use.—Glycerin is used as a demulcent, emollient, pill excipient, solvent and sweetening agent to replace syrup in pharmaceutical preparations. It is also used as a laxative in the form of suppositories.

# Polyethylene Glycol Ointment

Action and Use.—Polyethylene glycol ointment is a water-soluble ointment base made from polyethylene glycol 400 and 4000. (The latter is known commercially as Carbowax 4000.) The polyethylene glycols possess a wide range of solubilities and compatibilities and are useful constituents of creams, lotions, and ointments.

#### Cholesterol

Action and Use.—Cholesterol is used as an absorbing base for the incorporation and emulsification of drugs in oils and fats.

## Rose Water Ointment (Cold Cream)

Action and Use.—This ointment contains white wax, expressed almond oil, sodium borate, rose water and other ingredients. It is soothing to the skin and is frequently used alone or as an ointment base to incorporate other ingredients.

#### Petrolatum Rose Water Ointment

Action and Use.—This ointment is similar to rose water ointment except that expressed almond oil is omitted and liquid petrolatum is used in its place. This change reduces the cost of preparation.

#### Expressed Almond Oil

Action and Use.—Expressed almond oil is used as an emollient.

#### Zinc Oxide Ointment

Action and Use.—This ointment contains approximately 20 percent zinc oxide powder in a base consisting primarily of liquid and solid petrolatum. It is soothing and softening to the skin.

# PROTECTIVES AND INERT SUBSTANCES

Protectives are insoluble, chemically inert substances, in a fine state of subdivision, which are used locally to protect the surfaces against irritating or poisonous substances or mechanical injuries. They act mainly by preventing friction and absorbing moisture.

A number of chemically inert powders are used internally as protectives, particularly in the treatment of ulcerations and irritations of the intestinal tract.

## Starch

Action and Use.—Starch is used as a dessicant dusting powder and is usually combined with tale or some other dusting powder. In solution it is sometimes used as an enema in treatment of irritation of the rectum. In pharmacy, it is employed as an excipient and a dusting powder for pills. Starch may also be used as a nutrient.

#### Bentonite

Action and Use.—Bentonite is used as a suspending and emulsifying agent, a protective colloid for the stabilization of suspensions, and as an adsorbent and protective powder in dermatology.

#### Lactose

Action and Use.—Lactose is sugar obtained from milk which occurs as white crystalline masses or white powder. Since it is less sweet than sucrose, it is used chiefly in infant feeding and, in pharmacy, as a diluent for powders and tablets.

# Talc

Action and Use.—Talc is used as a dusting powder in treatment of irritated skin. It is also used in pharmacy as a filtering medium and as a dusting powder for pills and suppositories.

#### Purified Cotton

Action and Use.—Chemically, cotton is pure cellulose. It is largely used as a mechanical protective, especially in surgery, often being medicated by soaking it in medicinal solutions and then drying it.

## Bismuth Salts

Action and Use.—The insoluble salts of bismuth are used chiefly in the treatment of ulcerations and inflammations of the digestive tract. They

are usually administered suspended in water, at intervals of 2 to 4 hours. The theory on which their use is based is that they coat the crater of the ulcer and afford mechanical protection. Some bismuth salts are employed locally as protectives to the skin and open cuts. Other bismuth salts have been used in the treatment of syphilis, being used in conjunction with the arsenicals or as an adjuvant during intervals between arsenical administrations.

Bismuth Subcarbonate (Basic Bismuth Carbonate)

Dose Usual: 1 gram (15 grains) 4 times a day Dose Range: 1 to 4 grams

Bismuth Subnitrate (Basic Bismuth Nitrate)

Dose Usual: 1 gram (15 grains)

Bismuth Subgallate (Basic Bismuth Gallate, Dermatol)

Action and Use.—Bismuth subgallate is used chiefly as a dusting powder in the treatment of various skin diseases and wounds. It is occasionally used in the treatment of enteritis.

Dose Usual: 1 gram (15 grains)

Bismuth Subsalicylate (Basic Bismuth Salicylate)

Action and Use.—Bismuth subsalicylate is used occasionally in the treatment of enteritis and has been used to a considerable extent as a suspension in oil in the treatment of syphilis.

Dose Usual: I.M., in oil, antisyphilitic, 0.1 gram (1½ grains) weekly

Dose Range: Antisyphilitic, up to 0.2 gram

#### Aluminum Paste

Action and Use.—Aluminum paste is used as a protective dressing applied topically as required. Dose Usual: Topical, as 9 to 10% ointment

## **ADSORBENTS**

Adsorption is the process whereby a solid attracts and concentrates upon its surface, in a thin layer, the molecules of gases, liquid, or dissolved substance by adhesion. Many powders possess adsorptive powers, and they are termed adsorbents.

Adsorbents are effective in the treatment of various intestinal disorders such as diarrhea caused by food poisoning or dysentery, chronic ulcerative colitis, and intestinal fermentation. They are also effective in the treatment of alkaloidal poisoning and poisoning by salts of certain heavy metals.

# Kaolin (China Clay)

Action and Use.—Kaolin is a native hydrated aluminum silicate, powdered, and freed from gritty particles by elutriation. It may be described as a soft, white, or yellowish-white powder or lumps, with an earthy or claylike taste. When moistened with water, it assumes a darker color and develops a marked claylike odor. It is used as an adsorbent in the treatment of various forms of enteritis and as a dusting powder in the treatment of certain skin afflictions, such as weeping eczema. It is also used as a pill excipient and diluent for oxidizing agents.

# Kaolin Mixture With Pectin (Kaopectate®)

Action and Use.—This preparation contains kaolin and pectin in a flavored vehicle. It is an adsorbent and demulcent and is frequently used in the treatment of intestinal disorders such as diarrhea, and so forth.

Dose Usual: 30 ml.

#### Activated Charcoal

Action and Use.—Activated charcoal is a fine black powder, odorless, tasteless, free from gritty matter. Whenever Carbo Ligni is prescribed, activated charcoal must be used. It is used largely in treating ailments of the gastrointestinal tract where it overcomes hyperacidity, adsorbes fermentative gases, and helps to remove irritating substances from the intestines. It is also effective as an antidote in the treatment of various poisonings. In pharmacy, it is used as a filtering medium and clarifying agent.

Dose Recommended: 2 to 8 grams

## **IRRITANTS**

Irritants are drugs which act locally on the skin to produce inflammation. They injure protoplasm, and the reaction which follows is an effort of the defense mechanism to protect the tissue. The response to the application of the irritant is an increased circulation to the affected part, accompanied by a localized vasodilation, followed by a feeling of warmth, comfort, and sometimes itching.

Irritants are classified as rubefacients, drugs which produce redness of the skin, and vesicants, drugs which are capable of producing blisters.

Blisters are formed when the irritation has caused a wide dilation of the capillaries, permitting the plasma to escape into the extracellular spaces and collect under the skin. Drugs may possess both rubefacient and vesicant properties, depending on the concentration and period of application.

When irritant substances are used to excite a reflex influence on some part of the body other than that to which they are applied, they are called counterirritants. They help to alleviate pain, congestion, and spasms by the irritation of the skin.

Drugs are now little used to produce an irritation or counterirritation. Physical therapy is usually employed in the form of heat pads, hot wetpacks, diathermy, infrared lamps, and other methods. Certain drugs such as camphor, chloroform, and turpentine are used as irritants but are discussed elsewhere under their more important uses.

# Black Mustard (Brown Mustard)

Action and Use.—Black mustard contains a glycoside, sinigrin, and an enzyme, myrosin. In the presence of water, myrosin decomposes sinigrin to form allylisothiocyanate, a very irritating principle, which is not present in the dry seed. Black mustard is an efficient emetic, useful in the treatment of poisons. It is also used in the form of a plaster as a counterirritant. Plaster is made by combining 1 part mustard with 4 parts flour.

NOTE: Before it is applied, mustard plaster should be thoroughly moistened with *tepid* water.

Dose Usual: Emetic, 10 grams in about 200 ml. of warm water.

## Cantharides (Spanish Flies)

Action and Use:—This drug is seldom employed in modern therapeutics but is included because of its interesting toxicology. Poisoning by this drug may be encountered in areas of the United States which are located in close proximity to foreign countries. The National Formulary cautions against the use of cantharides with an ammonical odor.

The active constituent of cantharides is canthardin, of which the yield is about 0.6 percent. Canthardin has a blistering and reddening action. Taken internally, cantharides have an intense irritant action on the gastrointestinal and genitourinary tracts. It is infrequently used as a blistering agent and occasionally is prescribed in hair tonic for its stimulating action.

Toxicology.—In a few minutes, toxic doses of cantharides produce a burning pain in the pharynx and esophagus, and a sense of stricture in the throat, followed by epigastric pain, vomiting, and Vomitus may be bilious or bloody; stools, mucus and bloody. Purging is accompanied by rectal pain. There is a burning pain in the genitourinary tract with a great desire to urinate; urine may be albuminous and scanty and priapism is present. The chief damaging action is on the kidneys and bladder.

Treatment.—The treatment is symptomatic. Wash out the stomach, give mucilaginous drinks, avoid the use of oils as they accelerate the poisonous action. Give saline cathartics to eliminate the poison from the intestines and opiates to alleviate

# Methyl Salicylate (Oil of Wintergreen)

Action and Use.—Methyl salicylate is generally used as a counterirritant and rubefacient in the treatment of strained muscles and for relief of rheumatoid conditions. It is sometimes diluted with mineral oil before application to the skin.

CAUTION: Not to be used internally due to its acute toxicity; 30 ml. of this drug may cause death when taken internally.

#### Liniments

Action and Use.—Liniments are solutions or mixtures of various substances in oil, alcoholic solutions of soap, or emulsions, intended for external application. They are usually applied with friction and rubbing of the skin and produce rubefacient, counterirritant, mildly astringent, and penetrating effects. Basic and representative are camphor and soap liniment, chloroform liniment, and camphor liniment.

#### **ASTRINGENTS**

Astringents are drugs which have the power to contract tissue, usually by the precipitation of protein. Because their penetrating and precipitating action is weak, only the surface cells are affected. This action causes a reduction of cell membrane permeability, but the cell still remains The term astringent is also applied to certain drugs, such as epinephrine and ephedrine. which have the power to shrink the mucous membrane and raw tissue without precipitating protein. Astringents are divided into two groups, vegetable and mineral, according to their origin.

Therapeutic uses of astringents are:

- 1. To check excessive secretion in diarrhea and to check excessive secretion of sweat.
  - 2. To stop bleeding in local hemorrhage.
  - 3. To promote healing by mild irritation.

# Tannic Acid

Action and Use.—Tannic acid is one of the most valuable astringents and is of vegetable origin. The vegetable astringents owe their action to the presence of tannins. Tannic acid is used externally in the form of ointment or spray of a weak solution to check secretion in weeping ulcers, bedsores, and similar conditions; as a styptic in treatment of local hemorrhage; in ointment or suppositories in the treatment of hemorrhoids; occasionally as a chemical antidote in alkaloidal or heavy metal poisonings.

Tannic acid was once extensively employed in treatment of burns but has lost favor except in very minor cases where a 10 percent solution may be employed. It should not be used in treatment

of large denuded areas.

#### Alum (Alumen)

Action and Use.—Alum is used extensively as a local astringent in treatment of excessive sweating, especially of the feet. It is also used as a styptic, as an astringent in vaginal douches, and internally in the treatment of lead colic to precipitate the lead in the intestinal tract.

NOTE: Ammonium alum and potassium alum have a similar therapeutic action but differ as to chemical structure.

# Aluminum Acetate Solution (Burow's Solution)

Action and Use.—This preparation is used as an astringent in the form of wet dressings. It has somewhat of an antiseptic action. It has a soothing action on the skin.

#### Zinc Sulfate

Action and Use.—Zinc sulfate is used internally as an emetic. It is one of the most valuable emetics in various poisonings. It works quickly and efficiently and there is no danger of poisoning because of the promptness of the emesis produced. It is also used as an antiseptic and astringent in washes for the eye, nose, throat, urethra and vagina.

Dose Recommended: Emetic, 1 gram in 60 to 100 ml. of water

## Zinc Chloride

Action and Use.—Zinc chloride is antiseptic and astringent and is used in irrigating washes for the eyes, nose, mouth, urethra, and vagina.

Dose Recommended: Topical, as 0.1 to 1.0% aqueous solution

## Zinc Oxide

Action and Use.—Zinc oxide is mildly astringent and antiseptic. It is used in the treatment of various skin diseases, where is may also have some protective action in the form of dusting powders, ointments, lotions, and pastes.

Examples of zinc oxide preparations are zinc oxide paste (Lassar's Paste), zinc oxide ointment, zinc oxide hard paste (Unna's Hard Zinc Paste), zinc gelatin (Zinc Gelatin Boot), zinc oxide soft paste (Unna's Soft Zinc Paste).

# Calamine

Action and Use.—Calamine is used in the treatment of various skin afflictions in the same way as zinc oxide, i.e., in the form of lotion, ointment, and dusting powders. Calamine consists essentially of zinc oxide with small amounts of ferric oxide which gives it a pink color. It is astringent and protective and is generally used externally in the form of lotions and ointments, some examples of which are calamine lotion, phenolated calamine lotion, calamine ointment, calamine liniment.

## Lead Salts

Action and Use.—The soluble salts of lead are actively astringent but less irritating than most other mineral astringents. The insoluble salts are used as mechanical protectives. In spite of their insolubility, when they are applied to raw surfaces or mucous membranes, they may be absorbed in quantities large enough to produce chronic poisoning. They have fallen into disuse and are seldom employed in modern therapeutics. They are of interest only from a toxicologic

viewpoint and are discussed in Review of Toxicology, this chapter.

Lead salts that may be encountered are lead acetate (sugar of lead), lead subacetate solution (Goulard's Extract).

# ANTIMALARIALS

#### Quinine

Action and Use.—Locally, quinine is a general protoplasmic poison. Like many other poisons. it stimulates in low concentrations and depresses in high concentrations. It has a paralyzing action on the sensory nerves, with a local anesthetic effect. It lowers body temperature and resembles the salicylates in analgesic potency. Therapeutic doses have little effect on the central nervous and cardiovascular systems, but large doses depress the heart and cause vasodilation. It has an oxytocic action on the uterus. It causes a decrease in leukocytes, particularly the polymorphonuclears. It is irritant to the gastrointestinal tract and increases the secretion of gastric juices. Large doses may cause nausea. vomiting, and diarrhea.

It is toxic to bacteria and many unicellular organisms such as trypanosomes, yeast, plasmodia, and spermatozoa.

#### Quinine Sulfate

Action and Use.—Quinine and its salts are used mainly in the treatment of malaria. In the prophylaxis of the disease, it does not prevent infection but keeps the plasmodia at a low level of multiplication so that the clinical symptoms do not develop. When the drug is stopped, the disease may appear. It overcomes the acute symptoms of malaria by depressing the multiplication of plasmodia and stimulating some of the parasites to change to a sexual form which cannot cause the disease in man. It is also used in the treatment of blackwater fever.

Quinine is used as an analgetic in the treatment of headache, muscular rheumatism, and neuralgia; as an antipyretic; an oxytocic; and stomachic.

Toxicology.—The symptoms are ringing in the ears and a sensation of fullness in the head. Larger doses may cause difficulty in hearing or deafness. There may be severe headache, flushed skin, disturbed vision, profuse sweating, abdominal pain, nausea, vomiting, purging, difficult breathing, general weakness, delirium, convulsions and collapse.

Treatment.—The treatment is symptomatic. The effects gradually wear off, although partial deafness may persist for several days.

Dose Usual: 1 gram daily for 2 days, then 600 mg. daily for 5 days

# Primaguine Phosphate

Action and Use.—This drug was successfully tested in Korea. It is reputed to be curative for malarial infection due to *Plasmodium vivax*. It acts primarily on the exo-erythrocytic forms. It is sometimes given in conjunction with chloroquine to prevent relapse.

Dose Usual: 26.5 mg. (15 mg. of base) daily for 14 days

Dose Range: 17.5 mg. to 26.5 mg. (10 to 15 mg. of base)

# Chloroquine Phosphate (Aralen®)

Action and Use.—Chloroquine phosphate is a very effective antimalarial. It accomplishes a radical cure of falciparum malaria and is an excellent suppressive for vivax malaria. The drug is also effective in the treatment of amebic hepatitis. Treatment for the latter requires 2 to 3 weeks.

Dose Usual: Suppressive, 500 mg. weekly
Therapeutic, 1 gram immediately,
then 500 mg. in 6 hours, and 500
mg. on the second and third day

# **AMEBACIDES**

Amebiasis is a disorder due to the infestation of the tissues by the pathogenic ameba *Endamoeba histolytica*. It is a widely prevalent disorder particularly in tropical and semi-tropical lands. Drugs which have amebacitic action are a diverse group and are variously derived.

## Emetine Hydrochloride

Action and Use.—Emetine has a direct lethal action on the *Endamoeba histolytica*. It is more effective against the motile forms than the cysts, as the concentrations strong enough to destroy the cysts cannot be tolerated by the body. Emetine is only employed to control the diarrheal or dysenteric symptoms. When these disappear it is replaced by carbarsone, chiniofon, or Vioform (brand of iodochlorhydroxyquin).

Emetine should never be administered in doses

larger than 60 mg. per day or for a period longer than 10 to 12 days. During the course of therapy the patient should be closely observed for any toxic symptoms. Emetine is a general protoplasmic poison and may cause damage to the liver, kidney, and heart. The first symptoms are nausea, vertigo, and severe diarrhea with bloody stools.

Dose Usual: Subcutaneously, 1 mg. per kg. of body weight (but never exceeding 60 mg.) daily for 5 to 10 days

Dose Range: 30 to 60 mg.

#### Chiniofon

Action and Use.—Chiniofon has a direct amebicidal action because of its iodine content. It is clinically effective against both the motile and the cyst forms, but is somewhat less rapid than emetine in its action on the motile forms. It acts only on the organisms in the intestinal tract and is ineffective in amebic abscesses and hepatitis. It is one of the safest and most efficient amebicides and is used in all forms of chronic and acute intestinal infection. It is less toxic than carbarsone. The patient need not remain in bed during the treatment, unless the disease makes it necessary. Chiniofon is nontoxic in therapeutic doses and rarely causes any toxic effects.

Dose Usual: 250 mg. 3 times a day for 7 days Dose Range: 250 to 750 mg.

#### Carbarsone

Action and Use.—Carbarsone is an organic pentavalent arsenical. Its direct amebicidal action is due to its arsenic content. It is effective against the cyst and motile forms. It acts only on infection in the intestines and is ineffective against amebas in abscesses of the liver and other organs. It is used in both acute and chronic cases. It is also employed in the treatment of *Trichomonas vaginalis* vaginitis. It can be given orally or rectally and requires no special adjuvants, bed rest, or diets. It has very little toxic effect.

Dose Usual: Oral, 250 mg. twice a day for 10 days

Dose Range: 100 to 250 mg.

# Diiodohydroxyquin (Diodoquin®)

Action and Use.—This drug is usually administered in the form of tablets in the treatment of

intestinal amebiasis and Trichomonas hominis infections.

Dose Usual: 650 mg. 3 times a day for 20 days Dose Range: 650 mg. to 1 Gram

lodochlorhydroxyquin (Vioform®)

Action and Use.—Iodochlorhydroxyquin is used internally for intestinal amebiasis and externally as a dusting powder for wounds and skin eruptions.

Dose Usual: 250 mg. 3 times a day for 10 days Dose Range: 250 to 500 mg.

# **ANTHELMINTICS**

Anthelmintics are drugs which expel, paralyze, or kill intestinal worms. They are divided into vermicides which kill or paralyze the worm, and vermifuges which cause its expulsion. Taeniacides and taeniafuges act on the tapeworm.

The worms which commonly infest man are pinworm, whipworm, fluke, threadworm, roundworm, hookworm, and tapeworm. They infest the intestinal tract and some, particularly the flukes, penetrate the tissue of certain organs. They injure the host by robbing him of food, causing mechanical injury to the organs or obstructing their ducts, producing toxic substances which may be absorbed by the host, and providing an entry for bacteria and other organisms by injuries to the body tissue.

Toxicology.—Most anthelmintics are toxic to the host as well as to the worm. Many of the older drugs are highly toxic, but are being replaced by synthetic drugs which are safe as well as effective.

## Aspidium

Action and Use.—Aspidium contains about 1.5 percent filicin as the active constituent. It is particularly effective against tapeworm.

Two or three days prior to administration of the drug, the patient should be placed on a fatfree diet, high in protein and carbohydrate. It is usually given on an empty stomach and followed within a few hours with a saline cathartic. Aspidium is generally administered in the form of the oleoresin.

Toxicology.—Aspidium is an irritant to the intestinal tract. It stimulates the spinal cord, sometimes producing convulsions. The stimulation is followed by depression, affecting also the medulla,

respiration, heart, and smooth muscle. In mild poisoning there may be headache and vertigo, followed by gastroenteritis, nausea and vomiting, visual disturbances, convulsions, and delirium.

Treatment.—Treatment consists of immediate purging of the intestinal tract, followed by symptomatic treatment.

Dose Usual: Oral, as oleoresin, 5 grams

Dose Range: 3 to 5 grams

Chenopodium Oil (American Wormseed Oil)

Action and Use.—Chenopodium oil is used in the treatment of infestations of hookworm, roundworm (ascaris), and dwarf tapeworm.

Toxicology.—The toxic actions of this drug make it undesirable, and it has been replaced largely by other less poisonous ones. Locally it has an irritant effect upon the gastrointestinal tract. It has first a stimulating and then a depressing effect on the central nervous system and also affects sight and hearing. Large doses depress the heart muscle and lower blood pressure. The symptoms are nausea, vomiting, ringing in the ears, impaired vision, shallow respiration and possible convulsions.

Treatment.—Treatment consists of gastric lavage and a saline cathartic followed by symptomatic treatment.

Dose Usual: As anthelmintic, single adult dose 15 min.

Tetrachloroethylene (Perchlorethylene, Ethylene Tetrachloride)

Action and Use.—Tetrachloroethylene has limited value in treatment against pinworms. It is less toxic than carbon tetrachloride which was formerly extensively employed.

Dose Usual: Adult, 3 ml. (45 min.); child, 0.2 ml. per year of age

Dose Range: Adult, 2 to 4 ml.

Hexylrescorcinol (Crystoids Anthelmintic®)

Action and Use.—Hexylrescorcinol is a powerful vermicide of low toxicity, effective against hookworm, pinworm, dwarf tapeworm, whipworm, and ascaris. It is particularly useful in the treatment of debilitated persons or children.

It is administered orally in the form of pills (see below) with a hard gelatin coating. They should not be bitten into because contact of the drug with the mucous membrane may cause painful ulcerations.

Dose Usual: Pills, adult, 1 gram (15 grains); children, 100 mg. for each year of age

# Piperazine Citrate (Antepar®)

Action and Use.—Piperazine citrate is useful as an anthelmintic for the treatment of infections caused by pinworms and roundworms. This drug is relatively nontoxic to humans and has few side effects if employed in the recommended dosage. The dosage is based on body weight of the patient. For pinworms, the calculated dosage should be given in 2 equal doses morning and night for 7 days, followed by a rest period of 7 days and a second course for 7 days. For roundworms, a single course of 5 to 7 days is usually adequate.

Dose Recommended: 50 mg. per kg. of body weight but no more than 2 grams per day

# **ARSENICALS**

Arsenicals are divided into two classes, inorganic and organic. The inorganic arsenicals are powerful poisons, highly toxic to all cells, and are generally employed for their effects on body tissue. The organic arsenicals are less toxic to mammals but very poisonous to certain protozoa and, therefore, are used in the treatment of protozoal infections. The main purpose in their use is to produce a maximal effect on the invading organism with a minimal effect on the body tissue.

Arsenicals may be either trivalent or pentavalent. Only the trivalent compounds are active either toxicologically or therapeutically, but in the body the pentavalent arsenicals are reduced to the trivalent state.

## Arsenic Salts

Action and Use.—Arsenic is a general protoplasmic poison. Locally it has a weak effect on the skin. At first it produces a mild irritation but prolonged application may cause cell injury and necrosis. It has a pronounced effect on circulation. Large doses cause extreme vasodilation resulting in an escape of plasma from the circulation and a lowering of blood pressure, sometimes to shock level. The vasodilation in the gastro-intestinal tract caused by small doses may result

in increased secretion and absorption. Large doses may cause blisters to form in the intestines as a result of the escaping plasma. The blisters break, the epithelial fragments are cast off, and more plasma escapes. The presence of the plasma and the irritant action of the arsenic cause a diarrhea with rice-water stools. Arsenic also damages the kidney capillaries, tubules, and glomeruli.

By its vasodilating effect, arsenic may aid the nutrition of the skin and give it a healthy appearance. Continued use, however, may lead to abnormal proliferation of the skin, finally resulting in atrophy and degeneration. It may also cause peripheral neuritis. Arsenic affects the function of the bone marrow and alters the cellular composition of the blood. In a normal individual. small doses may lower the red cell count and large amounts may cause changes in the appearance of the cells. In anemia it may cause increase of the immature red cells and a decrease in the mature cells. Arsenic aids in the utilization of iron in the body and may act as an adjuvant to iron in the formation of red cells. It inhibits the formation of white cells when they are in excess and is used for this action in the treatment of leukemia.

Toxicology.—In acute poisoning the symptoms generally begin in from 15 to 30 minutes with an intense burning pain in the epigastrium, soon spreading to the whole abdomen. This is often accompanied by a constriction of the throat and an acrid, metallic taste, soon followed by violent vomiting and purging. The vomitus may be bilious or bloody. There is profuse diarrhea with characteristic rice-water stools. As the poisoning progresses, thirst becomes excessive, urine is suppressed, the extremities are cold, the pulse rapid and weak, respiration rapid and labored and painful from abdominal tenderness, the skin is dark and cyanosed, and the patient suffers from violent cramps. Collapse, convulsions, and coma ensue, death occurring in from 5 to 30 hours.

Treatment.—Treatment for acute poisoning is as follows:

- 1. Prompt evacuation of the stomach.
- 2. Even if the patient has vomited, gastric lavage is advisable.
- 3. Freshly precipitated ferric hydroxide may be used as a chemical antidote to form an insoluble arsenic compound in the stomach.

4. The patient should then be treated symptomatically, with particular attention to fluid loss and shock.

Chronic poisoning, which may result from repeated administration of small doses or exposure to arsenic compounds over a long period, is difficult to diagnose. The first symptoms may be associated with many disorders. They include weakness, loss of appetite, occasional nausea and vomiting, diarrhea or constipation, a garlic odor on the breath, congestion of the conjunctiva and symptoms of acute coryza, salivation, stomatitis, dermatitis, loss of hair and nails, liver and kidney disorders, peripheral neuritis affecting the extremities, and blood disorders.

Treatment.—The stomach of the patient should be washed out with warm water until no more arsenic can be recovered, then warm milk or a demulcent drink given. Dimercaprol (BAL) is used effectively in arsenic poisoning (see below).

BAL (British Anti-Lewisite) is indicated in poisoning by such drugs as oxophenarsine hydrochloride (Mapharsen) and in arsenic reactions, such as toxic encephalopathy, blood dyscrasias, dermatitis, and sudden febrile reactions occurring about 12 hours after administration of the arsenical. BAL has a greater affinity for the heavy metals than do the -SH groups in the cells and apparently removes the metal from the cell, forming a "metal-BAL compound." Probably a thioarsenite is formed which is rapidly eliminated from the body. BAL has the same action in mercurial poisoning. It is administered in oil.

# Arsenic Trioxide

Action and Use.—Arsenic trioxide is trivalent. It is commonly employed in the treatment of leukemia, usually as solution of potassium arsenite. The solution is also used in treatment of Vincent's angina. It is occasionally used in conjunction with iron in the treatment of secondary anemias, a use common to the inorganic arsenicals.

Dose Usual: 2 mg. (1/30 grain)

# ANTIMONY COMPOUNDS

Antimony is used as a parasiticide in the treatment of protozoan infections such as leishmaniasis. It closely resembles arsenic as a chemotherapeutic agent. Locally it is more irritant than arsenic, producing pustules and vesicles on the skin. Its

salts are emetics or, in smaller doses, nauseating expectorants.

Toxicology.—The symptoms are similar to those of arsenic. The outstanding effect of acute poisoning is shock, produced by pronounced vasodilation. Vomiting is considerable.

Treatment.—Treatment consists of gastric lavage with tannic acid, even if vomiting has occurred. This is followed by demulcents, opiates to relieve pain and diarrhea, and symptomatic treatment.

# Antimony Sodium Thioglycollate

Action and Use.—This drug is used in the treatment of schistosomiasis and leishmaniasis. It is less toxic and less irritating than tartar emetic. It is administered intramuscularly or intravenously.

Dose Recommended: I.V., I.M., 50 mg. (% grain) Stibophen (Fuadin®)

Action and Use.—Stibophen is used in the treatment of lymphogranuloma inguinale and schistosomiasis.

Dose Usual: I.M., 100 mg. increasing to 300 mg. on alternate days for 2 weeks

Dose Range: 100 to 300 mg.

# **BIOLOGICALS**

Biologicals are drug products, the manufacture of which depends upon the use of bacteria and bacterial products. They include serums, viruses, antitoxins, bacterial vaccines, antigens, extracts, and toxoids. They are used for prophylaxis, treatment, and diagnosis of infectious diseases. Their manufacture is controlled by the federal government. The manufacturer must be licensed by the Secretary of the Treasury and carefully examined by the U.S. Public Health Service.

The label on each package must state the name, address, and license number of the manufacturer, the proper name of the product, lot number, expiration date or date of manufacture or issue with period of potency, and the minimum potency or the fact that there is no standard of potency.

When biologicals are used as a prophylaxis, a condition of immunity is produced in the body. Immunity is a condition which exempts the body from contracting a contagious disease or which enables it to resist infection effectively. The resistance which exists normally in an animal or human being is termed natural immunity. The

resistance to a disease which exists (1) after an attack of the disease or exposure to repeated small doses of infective material (for example, the immunity following a smallpox attack or the immunity that comes in later years of youth and adult life to diphtheria), or (2) after vaccination against it with a specific vaccine or virus (for example, the immunity following vaccination against smallpox and diphtheria) is termed acquired immunity.

There are two types of acquired immunity, active and passive. Active immunity is the immunity acquired by the individual himself, either because he has had the disease or because the immunity to it has been artificially produced. Passive immunity is the immunity that depends upon defensive factors not originating in the person or animal protected, but passively acquired by the injection of serum from another that has acquired an active immunity to the disease in question.

Some of the defense factors of immunity are-

- 1. Antitoxins, antibodies which neutralize the soluble toxins.
- 2. Hemolysins or bacteriolysins, antibodies which cause complete dissolution of the invading microorganisms.
- 3. Opsonins or bacteriotropins, antibodies which alter the invading microorganisms so that they are more easily destroyed by certain of the body cells (the process known as phagocytosis).
- 4. Agglutinins and preciptins, antibodies which agglutinate or precipitate the invading microorganisms.

An antigen is any substance that can cause the formation and appearance of specific antibodies in the circulation of animals. Chemical protein structure is the necessary criterion for an antigen, the important structural unit being the aromatic amino acids. The term antigen is also commonly used to designate certain materials that lack the power of stimulating the production of antibodies but which possess the property of entering into an immunologic reaction with some constitutent serum (for example, Wasserman antigen). Various kinds of antibodies may be produced by the same antigen.

The word vaccine is from the Latin vacca meaning cow. Cowpox was called vaccinia or cow disease. The protection against smallpox vaccinia was designated vaccination. A bacterial vaccine is a

suspension of killed pathogenic bacteria in physiologic salt solution to which a preservative has been added. It is the same protein that causes the disease, yet so little altered that it will stimulate the body cells to form the substance which will promptly destroy the infecting agent. The bacteria are killed in the preparation of vaccine by using heat or chemicals.

When bacteria have successfully invaded the body, they produce disease through the following agencies—

- 1. Soluble or extracellular toxins. These toxins are poisons generated by the bacterial cells and discharged into the surrounding media, for example, diphtheria and tetanus toxins (exotoxins).
- 2. Intracellular toxins (endotoxins). These toxins are contained in the cell bodies and given off only after death of the bacteria, for example, typhoid endotoxin.
  - 3. Toxinlike substances.
  - 4. Bacterial proteins.
  - 5. Mechanical action of bacteria.

Diphtheria toxin may be converted into toxoid which is nontoxic, but has the same combining power with antitoxin as does the toxin from which it is derived. The conversion may be accomplished by heat or by treatment with different percentages of formaldehyde. Diphtheria toxoid treated or precipitated with alum has been found to be an effective immunizing agent.

Serums and antitoxins will produce a passive immunity. Antitoxins are obtained by immunizing a horse with repeated infections of the toxin. After several months, the blood acquires a sufficiently high antitoxin content. The horse is then bled, the serum collected, processed, and standardized. Serums are obtained in a similar manner with other animals. Serums are administered both as prophylactic and curative agents.

Phenol, cresol, glycerin, and merthiolate are used as preservatives in biologicals: see *United States Pharmacopeia* and *National Formulary* for details concerning official serums, antitoxins, vaccines, toxins, and toxoids.

## **ANTITOXINS**

Diphtheria Antitoxin

Dose Usual: I.V. and I.M., therapeutic, 20,000 units

#### Tetanus Antitoxin

Dose Usual: Parenteral, therapeutic, 40,000 units Prophylactic, 1,500 units

# Tetanus and Gas Gangrene Antitoxin

Dose Usual: Parenteral, prophylactic, one or more packages

#### **TOXINS**

Diagnostic Diphtheria Toxin (Schick Test)

Dose Usual: Intracutaneous, diagnostic, 0.1 ml. of the dilution

#### **TOXOIDS**

Diphtheria Toxoid (Diphtheria Anatoxin, Anatoxin-Ramon)

Dose Usual: Hypodermic, 0.5 or 1.0 ml. (as specified) repeat three times at intervals of 3 or 4 weeks for immunization

# Alum Precipitated Diphtheria and Tetanus Toxoids

Dose Usual: Hypodermic, 0.5 or 1.0 ml. (as specified) repeated once-after 4 to 6 weeks for immunization.

Alum Precipitated Diphtheria and Tetanus Toxoids and Pertussis Vaccine Combined

Action and Use.—A specific immunizing agent.

Dose Usual: Hypodermic, 3 injections 0.5 to 1.0

ml. 3 to 4 weeks apart

#### Tetanus Toxoid

Dose Usual: Hypodermic, 0.5 or 1.0 ml. (as specified) 3 injections at intervals of 3 or 4 weeks for immunization

# Alum Precipitated Tetanus Toxoid

Dose Usual: Hypodermic, 0.5 or 1.0 ml. (as specified) repeated once after 4 to 6 weeks for immunization

#### **VACCINES**

#### Cholera Vaccine

Dose Usual: Subcutaneous, 0.5 ml. and then, at intervals of 7 to 10 days, 0.5 ml. and 1 ml. for a total of 3 injections

#### Pertussis Vaccine

Dose Usual: Subcutaneous and I.M., 3 injections of 0.5 or 1.0 ml., as specified in the labeling, 4 to 6 weeks apart

# Alum Precipitated Pertussis Vaccine

Dose Usual: I.M., 3 injections of 0.5 or 1.0 ml., as specified in the labeling, 4 to 6 weeks apart

## Plague Vaccine

Dose Usual: Subcutaneous, 2 injections of 0.5 and 1 ml., 7 to 10 days apart

#### Rabies Vaccine

Dose Usual: Subcutaneous, daily for 14 to 21 days

Killed virus vaccine: 2 ml. of 5% suspension or equivalent
Attenuated live virus vaccine: 1 ml.

of 5% suspension or equivalent

# Smallpox Vaccine (Cowpox)

Dose Usual: Contents of one container

# Typhoid Vaccine

Dose Usual: Subcutaneous, 3 injections of 0.5 ml., 7 to 28 days apart

# Typhoid and Paratyphoid Vaccine

Dose Usual: Subcutaneous, 3 injections of 0.5 ml., 7 to 28 days apart

#### Typhus Vaccine

Dose Usual: Subcutaneous, 2 injections of 1 ml., 7 to 10 days apart

#### Poliomyelitis Vaccine

Action and Use.—A formaldehyde-inactivated vaccine of poliomyelitis virus which is used to induce artificial active immunity against paralytic poliomyelitis.

Dose Recommended: Subcutaneous or I.M., 2
doses of 1 ml., 4 to 6
weeks apart and a third
dose of 1 ml. not less than
7 months after the second

## **TUBERCULIN**

Old Tuberculin (Tuberculin-Koch, Concentrated Tuberculin, Crude Tuberculin)

NOTE: Old tuberculin is diluted in a buffered diluent before injection.

Dose Usual: Diagnostic, intracutaneous, one 10 thousandth ml. (0.0001 ml.)

Purified Protein Derivative of Tuberculin (P.P.D. Tuberculin)

Dose Usual: Diagnostic, two 100 thousandths mg. (0.000,02 mg.) (Intracutaneous)

#### **SERUMS**

No attempt has been made to cover all immunologic agents. The following is merely a representative group. More information may be obtained from the *United States Pharmacopeia* or *New and Non-Official Drugs*.

Human Measles Immune Serum (Measles Convalescent Serum)

Dose Usual: Parenteral, therapeutic, 20 ml. Prophylactic, 10 ml.

#### Normal Human Serum

Action and Use.—Normal human serum is a sterile serum obtained by pooling equal amounts of the liquid portion of coagulated blood from eight or more individuals who are free, at the time of drawing the blood, of those diseases transmissible by blood transfusion. It is marketed as a liquid or dried serum.

Immune Serum Globulin (Human Immune Globulin, Measles Prophylactic)

Action and Use.—Immune serum globulin is a sterile solution of gamma globulin which contains the antibodies normally present in adult human blood. Each lot is derived from the plasma or serum pool of at least 500 individuals. It is a transparent or slightly opalescent, colorless, or brownish liquid.

Dose Usual: I.M., measles prophylactic, 0.22 ml. per kg.

I.M., measles modification, 0.045 ml. per kg.

Citrated Normal Human Plasma (Normal Human Plasma)

Action and Use.—Citrated normal human plasma is a sterile plasma obtained by pooling equal amounts of the liquid portion of citrated whole blood from eight or more individuals who are free, at the time of drawing the blood, from any disease transmissible by blood transfusion. It may be dispensed as a liquid, frozen, or dried plasma.

Dose Usual: I.V., 500 ml.

Normal Human Serum Albumin

Action and Use.—Normal human serum albumin is a sterile solution of the serum albumin component of blood from healthy donors. It complies with the official requirements of the National Institutes of Health of the United States Public Health Service. A moderately viscous, clear, brownish, odorless liquid.

Dose Usual: I.V., 100 to 200 ml. representing 25 to 50 grams of albumin

#### Antivenin Serums

There are numerous antivenom serums available on the market against the venom of the black widow spider and certain poisonous snakes common to North and South America. These serums should be used with caution and in conjunction with well-established emergency first aid procedures.

# **IODIDES**

Iodides are very useful in the treatment of tertiary syphilis, often bringing about marked improvement in syphilitic bone disease and soft tumors of the brain and other organs. They do not kill the spirochete but dissolve the tumor formed by the action of the parasite on the tissue, making it more readily accessible to the various spirocheticides employed. Iodides are also used as expectorants in bronchitis to increase the flow of secretions and render them less viscid. They are a source of iodine in the treatment of simple or nontoxic goiter, and are used in the treatment of lead poisoning to aid in elimination of lead, and in the treatment of arteriosclerosis.

#### Potassium lodide

Dose Usual: 0.3 gram (5 grains) 3 times a day Dose Range: 300 mg. to 1 gram

#### Sodium lodide

Dose Usual: 0.3 gram (5 grains) 3 times a day Dose Range: 300 mg. to 1 gram

Diluted Hydriodic Acid

Hydriodic Acid Syrup

Action and Use.—Therapeutic properties of diluted hydriodic acid and hydriodic acid syrup are those of the iodides. Traditionally the syrup is employed as a vehicle for expectorant drugs.

CAUTION: Not to be dispensed or used in preparation of other products, if either contain free iodine.

Dose Usual: As syrup, 4.0 ml. (1 fluidram)

Ferrous lodide Syrup

Action and Use.—Ferrous iodide syrup combines the effects of the iodide and iron. It contains about 7 percent of ferrous iodide.

Dose Usual: 1.0 ml. (15 min.)

# CALCIUM SALTS

The calcium ion is present in the extracellular fluid. The blood serum in a healthy man contains about 10 mg. of calcium per 100 milliliters. The average adult requires about 0.45 gram of calcium daily. A deficiency of calcium in the blood results in a hyperirritability of the muscle fibers and nerve centers, and a lessening of the contractile power of the muscles. The heart beat becomes weaker and more rapid, violent convulsions may occur, and there is delay in the coagulation of the blood. If the cause of the deficiency is prolonged, the blood will compensate by withdrawing calcium from the bone.

Abnormal quantities of calcium in the blood result in an increase in the tone and contractile power of the heart, a lessening of the irritability of the nerve and muscle fibers, and a hastening of clotting time of the blood.

Calcium is frequently administered in pregnancy and lactation; in treatment of various bone diseases such as rickets and osteomalacia; and in treatment of tetany. Calcium is also administered to hasten clotting time of the blood. It is usually supplemented with phosphorus and vitamin D

#### Calcium Chloride

Action and Use.—Calcium chloride is administered intravenously. It is too irritating to the stomach to be given orally.

Dose Usual: I.V., 1 gram (15 grains) 4 times a

#### Calcium Gluconate

Action and Use.—Calcium gluconate is less irritating than the chloride and may be given orally, intramuscularly, or intravenously.

Dose Usual: Oral, or as tablets, 5.0 grams (75 grains)

I.M. or I.V., 1 gram (15 grains)

#### Calcium Lactate

Action and Use.—Calcium lactate is less irritating than calcium chloride.

Dose Usual: Oral or as tablets, 5 grams (75 grains)

Dibasic Calcium Phosphate (Dicalcium Orthophosphate, Dicalcium Phosphate)

Action and Use.—Dibasic calcium phosphate is claimed to be superior to other calcium salts in the treatment of calcium deficiency because it presents a more favorable calcium phosphorus ratio.

Dose Usual: 1 gram (15 grains) 3 times a day Dose Range: 1 to 5 grams

# DRUGS USED IN TREATMENT OF ANEMIAS

#### IRON

Iron is essential to life. The body of an adult man contains about 3 grams. About 75 to 80 percent of this amount is present in the hemoglobin in a nonionizable form, the remainder being distributed in other body tissues. The normal daily requirement is about 5 to 8 milligrams.

When iron is absorbed from the food, it probably undergoes changes in the intestinal epithelium, enters the blood, and is finally taken up by the liver and stored there. From the liver it is released into the blood stream and utilized by the bone marrow in the formation of hemoglobin and new cells. Blood destruction takes place in the spleen; the iron is gradually given off and taken up again by the liver. The store of iron in the liver, spleen, and other tissues can be utilized to form hemoglobin.

Iron preparations are used to overcome nutritional disturbances. They improve nutrition by increasing the hemoglobin content of the blood. They are of particular value in anemias of low color index. Anemia with a color index below 0.6 is an iron deficiency anemia, also known as hypochromic anemia.

Certain ferric salts are used as styptics because of their astringent action.

#### Ferrous Sulfate

Action and Use.—The most used and probably the best preparation for oral use in iron-deficiency

anemias is ferrous sulfate. It is commonly dispensed as tablets or in syrup form.

Exsiccated ferrous sulfate (dried ferrous sulfate) is also dispensed as pills and tablets and is considered a more stable salt in air than the fully hydrated ferrous sulfate.

Dose Usual: 0.3 gram (5 grains) 3 times a day
As syrup, 8 ml. (2 fluidrams) 3
times a day

Exsiccated, 0.2 gram (3 grains) 3 times a day

Dose Range: 200 to 600 mg.

Exsiccated, 200 to 400 mg.

Reduced Iron (Iron by Hydrogen)

Action and Use.—Reduced iron is of value because the iron particles are so finely divided that they are easily acted upon by the fluids of the intestinal tract.

Dose Usual: 0.5 gram (7½ grains)

Ferrous Gluconate

Dose Usual: 0.3 grams (5 grains) 3 times a day

Saccharated Ferrous Carbonate

Dose Usual: 0.25 gram (4 grains)

Soluble Manganese Citrate (Manganese and Sodium Citrate)

Action and Use.—Manganese is said to increase the hematinic effect of iron and is occasionally prescribed with iron compounds.

Dose Usual: 0.2 gram (3 grains)

## LIVER EXTRACTS

Liver produces a remarkable and almost immediate improvement in the blood condition in most cases of pernicious anemia. The improvement continues as long as the patient remains on the liver diet. About the fourth or fifth day of therapy, an increase in the number of reticulocytes is noted, and this increase continues until the maximum is reached about the ninth day. At the same time abnormalities of the cells disappear, and there are signs of clinical improvement. The patient feels better, his color improves, nausea disappears, and his intestinal condition is improved.

Liver is also used in other macrocytic anemias,

and liver and iron are commonly prescribed in secondary anemias.

Liver is administered orally, and parenterally.

Liver Extract (Dry Liver Extract)

Action and Use.—Liver extract is a dry, brownish powder, somewhat hygroscopic containing that thermostable fraction of mammalian livers which increases the number of red blood corpuscles in the blood of persons afflicted with pernicious anemia.

Dose Usual: 1 U.S.P. unit daily Dose Range: 1 to 20 units

Liver Solution

Dose Usual: Oral, 1 U.S.P. unit daily

Liver Injection Crude

Action and Use.—Liver injection crude is a sterile solution in water for injection of that soluble thermostable fraction of mammalian livers which increases the number of red blood corpuscles in the blood.

Dose Usual: I.M., in terms of the equivalent of cyanocobalamin (vitamin B<sub>12</sub>), 1 mcg. daily

Dose Range: 1 to 20 mcg.

Liver Injection

Dose Usual: Same as Liver Injection Crude

Cyanocobalamin (Vitamin B<sub>12</sub>)

Action and Use.—Cyanocobalamin is the U.S.P. name for the compound more familiarly known as vitamin B<sub>12</sub>, which may be obtained from liver but which is prepared commercially as a byproduct in the manufacture of antibiotics. It is effective in the treatment of pernicious anemia and sprue. This is an extremely potent drug.

Dose Usual: I.M., 1 mcg. daily Dose Range: 1 to 20 mcg.

#### POWDERED STOMACH

The fraction present in the stomach which is capable of increasing the number of red cells in the blood is formed by the combination of two factors: (1) the intrinsic factor, which is present in the glandular layer of the stomach and in the gastric juice; (2) the extrinsic factor, which is present in such foods as meats, eggs, milk, liver, and wheat germ.

Pernicious anemia is accompanied by a disturbance in gastric secretion. It is probable that the disease is due to a deranged gastric function as a result of which the intrinsic factor is not present. Powdered stomach is prescribed to supply this lack. Its effects are similar to those produced by liver. Stomach is also used in the treatment of other macrocytic anemias.

## Powdered Stomach

Action and Use.—Powdered stomach is the dried and powdered defatted wall of the stomach of the hog. It contains factors which increase the number of red blood corpuscles in the blood of persons affected with pernicious anemia. Its activity is rapidly destroyed when the preparation is suspended in hot liquid.

Dose Usual: 1 U.S.P. unit daily

#### Liver With Stomach

Action and Use.—Occasionally liver and stomach are prescribed in combination. It is also dispensed in capsule form.

Dose Usual: Oral, 1 U.S.P. unit daily

Dose Range: 1 to 20 units

# HORMONES AND SYNTHETIC SUBSTITUTES

Substances which are secreted internally by certain glands and carried by blood or lymph to the other organs for the control of growth or activity are called *endocrine secretions* or *hormones*. There are numerous synthetic substances which closely resemble the natural substances in action and are therefore important in therapeutics.

### ADRENAL CORTEX HORMONES

The gluco-corticoids are the carbohydrate regulating hormones of the adrenal cortex. The members of this group are cortisone and hydrocortisone and their derivatives, prednisone, prednisolone, and fludrocortisone. These hormones affect fat, carbohydrate, and protein metabolism. They have been employed successfully in treatment of a large number of diseases, some of the most important of which are rheumatoid arthritis, asthma, blood disorders, inflammation, diseases of the eye and skin, hypersensitivity reactions, and

nephrosis. It should be noted that the effects achieved in these diseases in most cases are maintained only during therapy.

Dosage of gluco-corticoids varies with dosage form, acuteness of situation, prognosis, and expected duration of the disorder.

Contraindications.—Before administration the following should be ruled out: active peptic ulcer and infections which cannot be controlled by antibiotics; also conditions complicated by cardiovascular disease, renal insuficiency, diabetes mellitus, convulsive disorders, arrested tuberculosis. thrombophlebitis, and osteoporosis. It has also been reported that gluco-corticoid hormones cause rapid spread of metastatic carcinoma. gluco-corticoids are potent hormonal agents and, on prolonged administration, periodic laboratory studies are advised as safeguard against the danger of electrolyte imbalance. The following complications have been observed: mental symptoms, facial rounding (moon face), abnormal fat deposits, edema, excessive appetite and weight gain. acne, hirsutism, increased sweating, dry scaly skin, headache, weakness, increased blood pressure, and tachycardia.

# Cortisone Acetate (Cortone®, Cortogen)

Action and 'Use.—Cortisone acetate is used specifically in conjunction with desoxycorticosterone acetate in adrenal cortical insufficiency. It is not anti-inflammatory when injected intra-articularly.

Dose Recommended: 200 to 400 mg. per day, initially, in acute disorders. Dosage should be gradually reduced with total dosage per day of 100 mg. or less.

 $\begin{array}{c} \text{Hydrocortisone and Hydrocortisone Acetate } (Hydro-cortone^{\text{@}},\ Cortril^{\text{@}},\ Cortef^{\text{@}}) \end{array}$ 

Action and Use.—Hydrocortisone and hydrocortisone acetate are effective in smaller doses than cortisone; they are better suited for topical application and for intra-articular injection than cortisone.

Dose Recommended: For rheumatoid arthritis, 10 to 20 mg. 4 times daily for 2 weeks. Maintenance dose, 10 mg. per day. Prednisone (Meticorten®, Deltra®, Deltasone®)

Action and Use.—Prednisone is several times more potent than cortisone and hydrocortisone and disturbs electrolyte and water imbalance much less, but some of the complications characteristic of the whole group are increased in incidence.

Dose Recommended: For severe conditions, 10 mg. 4 times a day

For mild conditions, 5 mg. a day

Prednisolone (Meticortelone<sup>®</sup>, Hydeltra<sup>®</sup>, Delta Cortef<sup>®</sup>, Meti-Derm<sup>®</sup>)

Action and Use.—Prednisolone has the same characteristics as prednisone and is more suitable for intra-articular injection.

Dose Recommended: Same as for prednisone
Topical, 0.5% ointment 3
to 4 times a day

Dexamethasone (Decadron®)

Action and Use.—This drug is one of the more recent corticosteroids which is 7 times more effective than prednisone, and 35 times more effective than cortisone. Like the other steroid preparations, it is used in a variety of allergic and inflammatory disorders. It is noteworthy for its virtual absence of diabetogenic activity. Gastric distress seldom occurs.

Dose Recommended: 1.5 to 3 mg. stat, followed by maintenance dose of .75 mg. daily

Desoxycorticosterone Acetate (Cortate®, Doca Acetate®)

Action and Use.—Desoxycorticosterone acetate acts on the renal mechanism in the metabolism of sodium, potassium, and water. The effect is an increase in the retention of the sodium ion and water and an increase in the excretion of potassium. It may be used in the management of adrenal insufficiency to restore the serum sodium and potassium and the plasma volume to normal levels. The blood pressure is also elevated. Secondary to the blood volume increase, there results an increase in cardiac output with a decrease in nitrogen retention, increase in glucose and fat absorption from the intestine, and increase in strength and appetite. This is the limited range of desoxycorticosterone acetate. It has no

demonstrable direct effect on protein or carbohydrate metabolism and no effect on estrogenic or androgenic activity or on pigmentation.

Toxicity.—Administration of excessive amounts of desoxycorticosterone acetate produces significant toxicity. Frequent signs are edema, pulmonary congestion, cardiac dilatation and failure.

Dose Usual: I.M., 5 mg. daily
Buccal, 2 mg. up to 4 times a day

#### OVARIAN HORMONES

The ovaries secrete two types of hormones. The first to be recognized chemically belongs to the group of steroids called *estrogens*. The second hormone secreted, also steroidal, is the luteal or progestational hormone named *progesterone*.

Estrogenic substances are responsible for the development of the sex organs at puberty, and for the secondary sex characteristics such as texture of the skin, the growth and distribution of hair, the distribution of body fat, the character of the voice, and the maintenance of these characteristics.

Therapeutically the estrogens are employed in the relief of certain menopausal symptoms, in the treatment of gonorrheal vaginitis in children, in relief of postpartum breast engorgement, palliative treatment of certain breast cancers and prostate carcinomas, and in the treatment of senile vaginitis and pruritis vulvae. Natural and synthetic estrogens have similar effects on the body.

Progesterone, the luteal hormone, is present in the corpus luteum which is normally formed in the second half of the menstrual cycle, after ovulation has occurred. It is present throughout pregnancy. In the absence of pregnancy, the corpus luteum remains functional for about two weeks and then retrogresses. During pregnancy, progesterone prepares the endometrium for the implantation and nourishment of the fertilized ovum, prepares the mammary glands for lactation, and supresses further ovulation. It is used in the treatment and prevention of spontaneous, habitual, or threatened abortion, in the treatment of functional uterine bleeding, in treatment of dysmenorrhea and, in conjunction with estrogen, in amenorrhea.

The following listing of drugs is incomplete though representative. For more information

consult references listed at the end of the chapter.

CAUTION: These are powerful drugs and the dosage should be determined by a physician in accordance with the needs of the patient.

Estrone (Theelin®)

Dose Usual: I.M. 0.2 to 1 mg.

Estrogenic Substances, Conjugated (Premarin®, Konogen®)

Dose Recommended: Oral, 1.25 mg. daily

Chlorotrianisene (Tace®)

Dose Recommended: 12 to 24 mg. daily

Piperazine Estrone Sulfate (Sulestrex®)

Dose Recommended: 1.5 mg. daily for menopausal symptoms

Diethylstilbesterol (Stilbesterol)

Dose Usual: Oral, 0.5 mg. daily

Progesterone

Dose Usual: Buccal, 10 mg. up to 4 times a day I.M., 25 mg.

Ethisterone (Anhydrohydroxyprogesterone, Pranone®)

Dose Usual: Oral, 10 mg. up to 4 times a day

#### PANCREATIC HORMONE

The two primary functions of the pancreas are as follows:

1. The secretion into the intestine of a digestive juice containing the enzymes trypsin, lipase, and amylase. (These enzymes are discussed in this chapter under the heading of Digestants.)

2. The secretion into the blood of a hormone, insulin, which regulates carbohydrate metabolism.

Inadequate production of insulin by the part of the pancreas known as the Islets of Langerhans, is the cause of most cases of diabetes mellitus.

#### Insulin

Action and Use.—Insulin controls the oxidation of carbohydrates and the blood sugar level. A deficiency will cause a rise in blood sugar and other symptoms that characterize diabetes mellitus. The disease can be controlled by injections of insulin, in conjunction with a strict diet. Hyperinsulinism usually occurs from an overdose of insulin. The blood sugar level is lowered, resulting

in such symptoms as hunger, weakness, sweating, staggering, double vision, and rarely convulsions, coma and death. This is called *diabetic shock* and should be treated immediately by administering glucose by mouth and injection, or by any food containing sugar. *Diabetic coma* is the condition which can develop due to lack of insulin.

Insulin is used in the treatment of diabetes mellitus and diabetic coma; in treatment of schizophrenia by producing insulin shock; and in cases of impaired nutrition, to increase the weight of the patient.

Several types of insulin preparations are currently in use; the differences being due to alterations in solubility and consequently in the speed and duration of activity. For ease in comparing the time-span of the various preparations, the following table presents the onset, peak, and duration of their activity.

 $\begin{array}{cccc} {\bf Table \ I.--Speed} & and & Duration & of & Activity & of & Insulin \\ & & Preparations & \end{array}$ 

Type of Insulin	Onset (Hours)	Peak (Hours)	Duration (Hours)
1. Crystalline Insulin (Zinc Insulin Crystals)	1	9	6-8
2. Regular Insulin	1	3	6-8
3. Globin Zinc Insulin	1-2	6-12	18-24
I. Isophane Insulin (NPH Insulin, NPH Iletin)	2	10-20	16-24
5. Protomaine Zinc Insulin (Protamin Zinc Iletin)	4-6	16-24	24-48

#### Lente Insulin

Action and Use.—Lente insulin is another long-acting preparation which is now available. It so closely resembles NPH in time of action that they can be used interchangeably. It contains no foreign modifying protein and is therefore free from the possibility of producing local sensitivity reactions caused by protamine or globin. It is not adaptable, however, for use in place of unmodified insulin in handling diabetic emergencies because it should never be administered intravenously.

# Tolbutamide (Orinase®)

Action and Use.—This drug is an orally-active, hypoglycemic agent which has been found useful for the treatment of diabetes mellitus in carefully selected patients. In these patients this drug is capable of controlling diabetes without the use of insulin. Its usefulness is restricted to patients with a relatively mild, maturity-onset type of diabetes which cannot be controlled by dietary re-

strictions alone. In children it is rarely of value. It is currently believed that the drug stimulates certain cells in the pancreas to produce greater amounts of insulin. In adult diabetes requiring more than 40 units of insulin per day, tolbutamide is not likely to be effective. In general, patients who have a history of diabetic coma or those who develop ketonuria within 24 hours after withdrawal of insulin, rarely achieve benefit from tolbutamide. This drug is contraindicated in patients with juvenile or growth-onset types of diabetes mellitus.

It must be emphasized that the only real advantage of this drug over insulin is that it is effective when given orally. Insulin remains the indispensable drug of necessity in diabetic complications. The patient should be under the close supervision of a medical officer at all times in order that complications and untoward reactions will be recognized and treated immediately.

Dose Recommended: 3.0 grams the first day, 2.0 grams the second day, followed by a maintenance dose varying from 0.5 gram to 1.5 grams daily

# PITUITARY HORMONES

The pituitary gland is a small body about the size of a pea which is found in a niche in the sella turcica of the sphenoid bone. It is divided into an anterior and a posterior lobe, both of which secrete important hormones.

## Anterior Pituitary

In addition to its own specific functions, the anterior pituitary gland regulates the activities of other organs of internal secretion, while its own functional activity is dependent on other glands. It secretes six different hormones.

The hormones of the anterior pituitary, except for adrenocorticotropin, have not yet attained therapeutic prominence because of the difficulties surrounding their preparation in a purified active form, and because useful applications have not been proved.

# Somatotropic Hormone (Antuitrin-Growth®)

Action and Use.—This hormone is known as the growth hormone. A deficiency will cause pituitary dwarfism, in which the body is small but well

developed and the features are small. In some cases the sexual organs are not properly developed. Excessive secretion will cause giantism, a condition in which the individual is tall but of symmetrical growth, or a condition known as acromegaly which is characterized by overgrowth of the bones of the hands, feet, face, and thorax. This hormone is used in the treatment of pituitary dwarfism.

Dose Recommended: 60 to 100 units weekly in injections of 20 to 50 units.

# Gonadotropic Hormone (Antuitrin-S®)

Action and Use. - This is the sex hormone and it affects both male and female sexual functions. A deficiency of this hormone in juveniles causes a failure in the development of the sex organs and secondary sex characteristics. An excess of secretion causes a tendency toward sexual precociousness and premature puberty. The gonadotropic hormone is divided into two parts: (a) the follicle stimulating hormone (FSH); (b) the luteinizing hormone (LH). In females the FSH stimulates the maturation of the ovarian follicles and the LH hastens lutenization and production of progesterone. In males the FSH induces spermatogenesis and development of the seminiferous tubules in The LH stimulates the production of the testes. testosterone.

A gonadotropic hormone resembling that of the anterior pituitary is also found in urine of pregnant women and mares, and is believed to originate in the chorionic cells of the placenta. It is used in the treatment of cryptorchidism, sexual infantilism, functional dysmenorrhea, amenorrhea, and menorrhagia.

Dose Recommended: I.M. or subcutaneous, 500 to 1,000 units initially, 2 to 3 times a week

# Lactogenic Hormone (Prolactin, Luteotrophin)

Action and Use.—Lactogenic hormone has to do with secretion of milk by fully developed mammary glands. It is doubtful whether it has any effect on the development of the gland. It exerts a definite gonadotropic effect in maintaining the life and function of the corpus luteum. It is used to treat functional uterine bleeding and to stimulate milk production in women who do not show signs of lactation by the sixth day after delivery.

Corticotropin (ACTH, Adrenocorticotropin)

Action and Use.—This hormone stimulates the adrenal cortex to secrete its entire spectrum of hormones. Corticotropin is utilized rapidly by the body, and its effects rarely exceed 6 hours. In general, long term use of corticotropin produces undesirable effects. Hypertension is one of these. This drug is contraindicated for long term treatment in diabetes, hypertension, chronic nephritis, congestive heart failure, and Cushing's syndrome. This drug is used for the same disease conditions as the adrenal cortex hormones.

Dose Recommended: I.M., 40 to 50 U.S.P. units daily for adults, in 4 divided doses

Thyrotropic Hormone (Thyrotropic Factor)

Action and Use.—The lack of this hormone results in atrophy of the thyroid gland. An excess causes marked hyperplasia of the thyroid, an increase in the basal metabolic rate, and symptoms of hyperthyroidism. It is marketed as Thyrotropic Factor and is used in the treatment of thyroid hypofunction of pituitary origin.

# Posterior Pituitary

The activity of the posterior pituitary gland depends upon the presence of two substances, oxytocin, which has oxytocic properties, and pitressin, which has vasopressor and antidiuretic properties.

Posterior pituitary stimulates the uterus. The uterus is more sensitive to the drug during the first 2 weeks of the menstrual cycle and during the progress of pregnancy. Its action on the heart is variable, but it causes a rise in blood pressure by constriction of the capillaries. It has an anti-diuretic effect on the kidneys, said to be due to the presence of a hormone which is concerned with water metabolism. It has a stimulating effect on the intestinal muscles. Posterior pituitary extracts are used as oxytocics, as antidiuretics in the treatment of diabetes insipidus, and as stimulants to intestinal peristalsis in abdominal distention following abdominal operations.

# Posterior Pituitary Injection

Action and Use.—Since relatively purified extracts of oxytocin and vasopressin (see below) are available, there is little need to employ this

injection which possesses all the pharmacologic activities of the gland.

Dose Usual: Subcutaneous, 10 U.S.P. units Dose Range: Up to 10 units

# Oxytocin Injection

Action and Use.—A sterile solution in water for injection of the *oxytocic* principle from the posterior lobe of the pituitary body of healthy domesticated animals used for food by man. It is used to stimulate uterine contraction in obstetrical practice, chiefly to prevent postpartum bleeding.

Dose Usual: I.M., 1 ml.

Vasopressin Injection (Solution Pitressin)

Action and Use.—A sterile aqueous solution of the soluble *pressor* principle of the posterior lobe of the pituitary body of healthy domesticated animals used for food by man. It is used to raise the blood pressure, to relieve intestinal atony and that of the bladder following surgery, and for its antidiuretic action in diabetes insipidus.

Dose Usual: I.M., 1 ml.

## ANDROGENIC HORMONES

Androgens are male sex hormones, secreted in the testes. The true testicular hormone is called testosterone. It is necessary for the development of sex organs and the secondary sex characteristics of the male. Testosterone is used in substitutional therapy in men who have climacteric symptoms, in the treatment of castrates, and to suppress lactation. They are of some value in the treatment of cryptorchidism and pituitary dwarfism. They are administered orally, sublingually, intramuscularly, by inunction, and by subcutaneous implantation.

#### Testosterone Pellets

Action and Use.—Testosterone compressed in the form of pellets for tissue implantation.

Dose Recommended: The number of pellets implanted at one time is governed by the need of the patient, approximately 300 mg. is generally employed

Methyltestosterone (Metandren, Oreton-M)

Action and Use.—This drug is used for the same

purpose as testosterone except this form is suitable for oral, sublingual, or buccal use.

Dose Usual: Oral, 10 mg. 3 times a day

Sublingual or buccal, 5 mg. up to 4 times a day

Dose Range: Oral, 10 to 40 mg.

Sublingual or buccal, 5 to 20 mg.

Testosterone Propionate (Oreton®, Perandren®, Neo-Hombreol®)

Action and Use.—Same as testosterone (see above).

Dose Usual: I.M., 25 mg. (% grain)

#### THYROID HORMONE

The active constituent of thyroid is the hormone thyroglobulin, which is an iodine containing glob-

ulin yielding thyroxin upon hydrolysis.

The primary action of the thyroid is on the metabolic rate, or calorigenic action. In the presence of thyroid, cells metabolize faster. Thyroid is intimately related to other endocrine glands such as the anterior pituitary, gonads, and parathyroid. A deficiency of secretion may cause such conditions as myxedema, cretinism, menstrual disorders and low basal metabolic rate. Hypersecretion causes exophthalmic or toxic goiter.

Normal thyroid function depends upon adequate intake of iodine. A deficiency may cause excessive growth and enlargement of the gland, or simple goiter. The basal metabolic rate is not lowered. Administration of iodine will prevent occurrence

of simple goiter.

#### Thyroid

Action and Use.—Thyroid is used in the treatment of adult and juvenile myxedema, cretinism, menstrual disorders, obesity (where it should be used with caution), and certain bone and skin diseases. Thyroid is one of the few endocrine drugs which is active after oral administration.

Dose Usual: Tablet form, 60 mg. (1 grain) daily

Propylthiouracil (Propacil®)

Action and Use.—This drug is not a hormone nor is it a derivative of thyroid. It is discussed here because of its antithyroid action. Propylthiouracil interferes with the formation of thyroxin by the thyroid gland. It is used in the treatment of hyperthyroidism and thyroiditis.

Toxicology.—The toxicity of propylthiouracil is much less than that of the older drug thiouracil, although there is still some danger in its use. The most serious toxic manifestations are granulocytopenia, leukopenia, drug rash, and fever.

Dose Usual: 100 mg. (1½ grain) every 8 hours

Methimazole (Tapazole)

Action and Use.—An antithyroid drug about ten times more potent than propylthiouracil and having prompter action.

Dose Usual: 100 mg. every 8 hours

Dose Range: 75 to 150 mg.

## PARATHYROID HORMONE

The parathyroid glands regulate calcium and phosphorus metabolism. A deficiency of parathyroid secretion will cause a lowering of the blood calcium level and symptoms of calcium deficiency. Parathyroid injection is employed as a specific in the treatment of this condition. A proper diet is essential during this therapy. It is also used in the treatment of chronic lead poisoning as an aid in the elimination of lead from the bones.

Parathyroid Injection (Parathyroid Solution, Parathyroid Extract Solution)

Action and Use.—Parathyroid injection is a sterile solution of the water soluble principle or principles of the parathyroid glands which has the property of relieving the symptoms of parathyroid tetany and of increasing the calcium content of the blood serum in man.

Dose Usual: I.M., 50 U.S.P. units daily

Dose Range: 25 to 100 units

# ANTINEOPLASTIC AGENTS

These drugs are cytotoxic agents used in the treatment of malignant diseases. Most of these drugs are useful in depressing the growth of tumors. Drugs in this class include the nitrogen mustards, antimetabolites, and derivatives of folic acid. The leukemias and tumors of the blood-forming system are susceptible to treatment by these agents. In other lesions that do not respond to X-ray treatment or that cannot be treated surgically, these drugs provide some measure of relief.

#### Amin opterin Sodium

Action and Use.—Aminopterin sodium is a derivative of folic acid and is used in hematopoietic disorders characterized by the excessive increase of blood cells. This drug is indicated for the treatment of acute leukemia in children. Aminopterin produces temporary relief and increases survival from weeks to two years. It is contraindicated in pregnant patients since it is destructive to embryonic tissue. Constant supervision is essential when it is employed. This drug should be discontinued if ulcers of the mouth or gastrointestinal ulceration and bleeding develop. A fall in leukocyte count or a hemorrhage should likewise cause discontinuation of this drug. white blood cell counts and complete blood cell counts should be performed.

Dose Recommended: Oral, 0.5 mg. 3 to 6 times weekly

# Busulfan (Myleran®)

Action and Use.—Busulfan is not chemically related to the nitrogen mustards, but resembles this compound in its pharmacologic action. The effects of this drug are restricted mainly to the bone marrow. It is valuable in the treatment of chronic granulocytic leukemia, and is sometimes used in conjunction with radiation treatment. Periods of remission vary from weeks to months and this drug is usually discontinued when relief is obtained. It is ineffective in acute leukemia, Hodgkin's disease, and in certain solid tumors. Complete blood cell counts are necessary at least once a week. This drug should be withdrawn if signs of hemorrhage develop.

Dose Recommended: 2 to 6 mg. daily

# ${\sf Chlorambucil} \,\, ({\rm Leukeran}^{\circledR})$

Action and Use.—Chlorambucil is a nitrogen mustard derivative. This is an orally effective drug and is useful in the treatment of chronic lymphocytic leukemia and Hodgkin's disease. It sometimes produces a reduction in total leukocyte count. Chlorambucil has fewer side effects than other antineoplastic drugs, but occasionally produces gastric disturbances. A complete blood examination should be conducted at least once a week. Signs of hemorrhage should be watched for.

Dose Recommended: Chronic lymphocytic leukemia, from 0.03 mg. to 0.1 mg. per kg. body weight per day.

Mechlorethamine Hydrochloride (Mustargen Hydrochloride $^{\text{\tiny (B)}}$ )

Action and Use. - Mechlorethamine is a nitrogen mustard and is highly toxic. This drug is cytotoxic having a special affinity for certain tissues, for the blood forming systems, and for certain growths. The bone marrow and lymph tissues are significantly affected. Mechlorethamine is useful for Hodgkin's disease, lymphosarcoma, and certain types of chronic leukemia, among others. In conjunction with radioactive therapy, it has been found effective in certain cases. It causes temporary remissions of varying durations. duces pressure on the trachea in patients with thoracic lesions. Mechlorethamine is ineffective in the treatment of acute leukemia. It appears to be very effective in bronchogenic carcinoma; however, remissions are of short duration.

Nitrogen mustard therapy is also beneficial in certain metastatic carcinoma of the breast. This drug is extremely toxic locally and systemically, and must be administered under hospital supervision. Thrombosis and thrombophlebitis may result from injections. Toxic effects such as nausea and vomiting may be severe. Hemoglobin and red blood cell counts may decline. Occasionally skin eruptions may develop. This drug is stable in dry form only. Solutions are unstable and decompose on standing. Fresh solutions should be prepared before injection.

Dose Recommended: 0.1 mg. per kg. body weight daily for 4 days

Single doses should not exceed 8 to 10 mg.

# Mercaptopurine (Purinethol®)

Action and Use.—This drug is useful for treatment of acute leukemia. It causes temporary remissions and prolongs life in a large number of patients. Children generally respond better to this drug than do adults. Mercaptopurine becomes less effective in subsequent courses of therapy. Toxic effects such as depression of bone marrow may develop. Frequent blood cell counts are necessary. This drug should be discontinued if white blood cell count falls greatly. Nausea and

vomiting may develop, and ulceration of the intestinal tract also.

Dose Recommended: Initially, 2.5 mg. per kg. body weight each day

# Triethylene Melamine

Action and Use.—Triethylene melamine has actions and uses similar to those of the nitrogen mustards. It is effective in certain cases of cancer of the lymphatic and bone-forming systems. As the patient's condition deteriorates, this drug becomes less effective. It is especially effective in Hodgkin's disease, and is a useful adjunct to X-ray therapy. Side effects such as nausea and vomiting are infrequent and in general it produces less unpleasant side effects than are caused by nitrogen mustard therapy. Frequent blood counts should be made.

Dose Recommended: 2.5 mg. each morning, repeated twice with 2 grams of sodium bicarbonate before breakfast Maintenance dose, 2.5 to 5 mg. every 2 to 7 days

# VITAMINS

Vitamins are essential substances for maintenance of normal metabolic functions not synthesized in the human body in normally adequate quantities. They must, therefore, be provided from outside sources. Their absence results in malnutrition and specific deficiency diseases. Their chemistry is complex and nutritional experimentation is difficult, so our knowledge of them is being continually supplemented and revised. Vitamins A and E each contain two distinct factors and vitamin B has been fractioned into several factors. It is quite possible that additional vitamins will be discovered or that some of those already recognized may prove to contain more than one factor.

Vitamins are so widely distributed in foods that a normal diet, when properly prepared, usually provides an adequate amount. Some are destroyed by the preparation or preservation of certain foods, and as a result the diet needs to be supplemented with specific vitamins. Some manufacturers add vitamins to their products to replace those destroyed or removed in processing.

## VITAMIN A

Vitamin A is present in fish liver oils, liver, butter, eggs, cream, yellow vegetables, and fruits. In butter, cream, eggs, and carrots, both vitamin A and provitamin A (Carotene) may be present. Provitamin A is capable of being changed into vitamin A by body mechanisms.

Vitamin A is used to remedy such deficiency conditions as night blindness, xerophthalmia, and keratosis of the skin. The daily requirement for a healthy adult is about 5,000 U.S.P. units and for growing children about 6,000 to 8,000 units.

Oleovitamin A (Natural Vitamin A in Oil) Oleovitamin Capsules

Dose Usual: Daily, prophylactic, 5,000 units

## VITAMIN B

Vitamin B Complex consists of a number of factors, some of which have been identified and synthesized. It is less stable than vitamin A, although some of its constituents can withstand heat for a short time. The best natural sources are rice polishings, yeast, and liver. Other good sources include fruits, meat, milk, and eggs.

# Thiamine (Vitamin B<sub>1</sub>)

Action and Use.—Thiamine (Vitamin  $B_1$ ) was the first recognized constituent of vitamin B complex to be isolated in crystalline form. It is the antineuritic vitamin which prevents beriberi and polyneuritis. It is used as a specific for the prevention and treatment of beriberi. It may also be used in the treatment of patients with appetite loss resulting from dietary disturbance. An increase in thiamine may be necessary if metabolism is increased as occurs in patients with hyperthyroidism, or fevers.

Dose Usual: Therapeutic dose, 2 to 50 mg.

Riboflavin (Vitamin B2, Vitamin G, Lactoflavin)

Action and Use.—Deficiency of this vitamin causes pellagra and its principal use is in the treatment of this disease. Improvement occurs within 24 hours.

Dose Usual: 3 mg. daily

Nicotinic Acid (Niacin)

Action and Use.—Nicotinic acid and the amide are important in the treatment of pellagra. Large

doses of nicotinic acid produce flushing of the face and neck; but this reaction is harmless. It is not observed when nicotinamide is used.

Dose Usual: Oral, 15 mg. daily

Parenteral 50 mg., 3 to 10 times daily

#### Nicotinamide

Action and Use.—This is the amide of nicotinic acid and has the same uses.

Dose Usual: Oral and parenteral, 50 mg., 3 to 10 times daily

Dose Range: Up to 50 mg.

# Pyridoxine (Vitamin B<sub>6</sub>)

Action and Use.—Pyridoxine appears to be associated with certain neuromuscular conditions and with the utilization of fatty acids, but its value in the treatment of human disease is not yet clearly established. It has been used in the treatment of palsy, muscular atrophy and weakness, agranulocytic angina, and in combination with some of the antihistamines such as meclizine hydrochloride and cyclizine to overcome nausea and vomiting of pregnancy.

Dose Usual: 5 mg.

# Cyanocobalamin (Vitamin $B_{12}$ , Rubramin®)

Action and Use.—Cyanocobalamin is a cobalt-containing substance produced by the growth of suitable microbial organisms or obtained from liver. It is believed to be the true anti-pernicious anemia factor. (See Drugs Used in Treatment of Anemias, this chapter.)

Dose Usual: I.M., 1 mcg. daily, preferably administered in amounts of 10 to 15 mcg. at appropriate intervals

# Para-aminobenzoic Acid (PABA)

Action and Use.—Para-aminobenzoic acid is usually included as a member of the vitamin B complex. Its action in the human body is not clear. It is used to increase the blood level of streptomycin and salicylates. Recently, it has been used with encouraging results in the treatment of rickettsial diseases such as scrub typhus, louse-borne typhus and Rocky Mountain spotted fever.

Dose Usual: 10 grams (2½ drams)

#### Choline

Action and Use.—This member of the vitamin B complex is a constituent of lecithin and is chemically associated with acetylcholine. A deficiency in the diet of a mammal gives rise to fatty degeneration of the liver and kidney. It has been used effectively in the treatment of hepatitis and cirrhosis of the liver.

Dose Usual: As bitartrate, 2 grams (30 grains)
As dihydrogen citrate salts, 2 grams
(30 grains)

#### Folic Acid

Action and Use.—This factor of vitamin B complex is present in liver, kidney, yeast, and green leaves. Folic acid has been prepared synthetically. Chemically it is called pteroylglutamic acid. Its use is restricted to specific anemias and, if employed indiscriminately, may be dangerous.

Dose Usual: 10 mg. (% grain) daily Dose Range: 5 to 10 mg.

#### VITAMIN C

Vitamin C, or ascorbic acid, is the vitamin that is necessary for the prevention and cure of deficiency disease scurvy. It is also believed that a deficiency delays wound healing.

# Ascorbic Acid (Vitamin C)

Action and Use.—Ascorbic acid is present in potatoes, citrus fruits, green vegetables, tomatoes, and strawberries. It is relatively unstable in solution, and is readily lost during cooking if simple precautions to avoid aeration are not taken. Loss of vitamin C may occur in freshfruits and vegetables that are stored for any length of time.

Dose Usual: Requirement, 75 mg.; therapeutic, 150 mg.

Dose Range: Requirement, 25 to 75 mg.; therapeutic, 100 mg. to 1 gram

### VITAMIN D

Vitamin D is often called the antirachitic vitamin. It is fat soluble and is present in fish, liver oils, egg yolk, milk and butter. It affects the absorption and utilization of calcium and phosphorus in the body and is used in the prophylaxis and treatment of rickets in children and softening of the bone in adults. It has some

relationship with the functions of the thyroid and parathyroid glands. An excessive intake of vitamin D causes a decrease in the amount of calcium and phosphate in the intestinal contents and over calcification at the growing end of the bones.

Dose Usual: Average requirement, 400 units (10 mcg.) daily

# VITAMIN E

Vitamin E is found in wheat germ, vegetable oils (cottonseed oil), green leafy vegetables, meat and eggs. Little is known about the metabolism of this vitamin. Studies show that it is essential for the normal function of the nuclei of certain animal cells.

# Alpha-Tocopherol (Vitamin E)

Action and Use.—Alpha-tocopherol has been used in the treatment of sterility and habitual abortion, in muscular weakness and atrophy. There is, however, little evidence of its value.

Dose Usual: To be determined by physician

#### VITAMIN K

Vitamin K is the factor necessary for the maintenance of the normal prothrombin level in the blood. The normal prothrombin level is dependent not only on an adequate amount of vitamin K, but also on the presence of bile and normal bacterial flora in the intestinal tract, normal absorptive activity of the intestinal mucosa, and the presence in the liver of a sufficient number of active cells which are necessary for the synthesis of prothrombin from vitamin K.

# Menadione Sodium Bisulfite (Vitamin K3)

Action and Use.—This vitamin is used in the treatment of obstructive jaundice and in biliary fistulae where there is a tendency to hemorrhage because of a deficiency of prothrombin in the blood. It is administered during labor as a prophylaxis against hemorrhage, and in treatment of physiologic hypothrombinemia of the newborn. It is also used to neutralize the effects of the anticoagulant Dicumarol which has been used in clinical treatment of thrombosis.

Dose Recommended: I.M., I.V., subcutaneous, 2 mg. daily

Dose Range: 1 to 3 mg.

Phytonadione (Vitamin  $K_1$ )

Action and Use.—This drug is diluted to 300 ml. with physiologic salt solution and injected slowly, intravenously, to counteract heparin overdosage or in the treatment of selected hemorrhagic conditions.

Dose Usual: To be determined by the physician in accordance with needs of patient

# COMMON POLYVITAMIN PREPARATIONS

Widespread use of vitamins has served to control and even eradicate to a large extent the important deficiency diseases in this country. Rickets, for example, has become exceedingly rare. Pellagra, until recently prevalent in southern United States, is now controlled. However, many people and in all economic groups, fail to include all the foods essential for optimum nutrition. Among those seen in whom multiple subclassic vitamin deficiencies rather than full-blown individual entities are recognized include elderly persons whose diet is often deficient, those with food idiosyncrasies or faulty dietary habits, pregnant women who restrict their diet because of nausea and vomiting, victims of diseases interfering with digestion or utilization of food.

To list all polyvitamin preparations available would require more space than can be devoted. Following are some of the more representative ones:

# Cod Liver Oil

Action and Use.—Cod liver oil contains vitamins A and D. It is obtainable as emulsion in partially destearinated and nondestearinated form, to name a few.

Dose Usual: Non- and partially destearinated, 4 ml.

Dose Range: 4 to 16 ml.

#### Halibut Liver Oil

Action and Use.—Halibut liver oil contains a much higher proportion of vitamin A in comparison to D than any other fish liver oil. It is the preparation of choice when a high intake of vitamin A is desired and D is secondary.

Dose Usual: Daily, prophylactic, 1 capsule containing 5,000 units vitamin A

# Dried Yeast (Brewer's Yeast)

Action and Use.—Dried yeast contains thiamin hydrochloride, riboflavin, and nicotinic acid.

Dose Usual: 10 grams, 4 times a day

Dose Range: 1 to 10 grams

#### Decavitamin

Action and Use.—These are multiple vitamin capsules containing 10 varieties of vitamins and are used as a dietary supplement. They are available as capsules or tablets.

Dose Usual: 1 daily

# Triasyn B

Action and Use.—This preparation is a supplementary B-complex formula which contains in each capsule 2 mg. of thiamin hydrochloride, 3 mg. riboflavin, 20 mg. nicotinamide. It is available in capsule or tablet form.

Dose Usual: To be determined by physician according to needs of patient

# COAGULANTS AND ANTICOAGU-LANTS

The coagulation of blood consists of the transformation of the dissolved fibringen of the circulating blood into insoluble fibrin by the action of thrombin. Fibrinogen is an acid globulin, formed exclusively in the liver. Thrombin is a protein not contained in the circulating blood, but formed from prothrombin by the action of thrombokinase. which requires the calcium ion in the blood. Thrombin converts 2,000 times its weight of fibrinogen into fibrin. The prevention of coagulation is due to the continuous production of several antisubstances, especially antithrombin, associated with the albumin fraction which prevents the action of thrombin on fibringen, and antiprothrombin which keeps prothrombin in inactive The addition of citrate or oxalate combination. to shed blood, prevents coagulation by inactivating the calcium.

# **COAGULANTS**

# Oxidized Cellulose

Action and Use.—Oxidized cellulose is a form of cotton or gauze, slightly acid to taste, soluble in dilute alkalis but insoluble in acids or water. It is used as a surgical hemostatic agent, acting as an artificial clot.

# Absorbable Gelatin Sponge

Action and Use.—This is a sterile, absorbable, water-insoluble, gelatin-base sponge. It is used as a hemostatic agent when saturated with sterile normal saline solution or a thrombin solution. It may be left in the body since it is slowly absorbed.

#### Thrombin

Action and Use.—The thrombin in use as a drug is a sterile protein substance prepared from prothrombin of mammalian origin through interaction with thromboplastin in the presence of calcium. Before use it is added to sterile normal saline solution which can be applied topically to arrest capillary bleeding.

# Antihemophilic Globulin (Human)

Action and Use.—Antihemophilic globulin is used to hasten the clotting time of blood in treatment of hemophilia.

Dose Usual: Intravenously, 200 mg.

Dose Range: 200 to 600 mg.

# ANTICOAGULANTS

# Bishydroxycoumarin (Dicumarol®)

Action and Use.—This drug is used as an anticoagulant, acting by interfering with prothrombin formation in the liver. It prolongs the clotting time by exhibiting antiprothrombin and antithrombin effects in the blood stream; it does not produce an immediate effect. During bishydroxycourmarin therapy, if the prothrombin level drops below 15 percent of normal, its action should be neutralized by injections of high potency vitamin K. Whole blood transfusions should also be given. This drug should be employed only if laboratory facilities are available to test the level of the blood prothrombin.

Dose Usual: Initial, 200 to 300 mg.; thereafter, daily doses according to prothrombin determinations

# Heparin Sodium (Heparin®)

Action and Use.—Heparin is a mixture of active principles obtained from the liver or lungs of domesticated animals. It acts as antiprothrombin and antithrombin in the blood stream, and prolongs the clotting time of blood. It is used in the prophylaxis and the treatment of thrombosis, both postoperatively and during transfusion. It is

usually given by subcutaneous or continuous intravenous injection.

Dose Usual: Parenteral, 5,000 U.S.P. units

Repository form, I.M., 20,000 units every 12 to 24 hours

Dose Range: 5,000 to 30,000 U.S.P. units

# Protamine Sulfate Injection

Action and Use.—This drug is diluted to 300 ml. with physiologic salt solution and injected slowly, intravenously, to counteract heparin overdosage or in the treatment of selected hemorrhagic conditions. It is listed here because of its antagonistic action to heparin.

Dose Usual: To be determined by the physician in accordance with the patient's needs.

# DIAGNOSTIC AGENTS

In this section are included drugs that help to reveal the anatomic evidences of disease or to detect pathologic function. This list is a representative list only, and must not be considered as complete.

### Barium Sulfate

Action and Use.—Barium sulfate is employed in roentgenographic studies of the gastrointestinal tract. It is usually administered in water or with a mucilaginous substance. It is opaque to X-rays.

Toxicology.—Soluble barium salts are highly toxic. The symptoms are burning in the stomach, nausea, vomiting, diarrhea, vertigo, ringing in the ears, slow and irregular pulse, and possible convulsions. Death may occur within 1 hour, or be delayed for some time.

Treatment.—Treatment consists of the chemical antidote, magnesium or sodium sulfate. Gastric lavage and symptomatic treatment.

CAUTION: When barium sulfate is prescribed, the title should always be written out in full to avoid confusion with the poisonous barium sulfide or barium sulfite.

Dose Usual: Oral, 300 grams in suitable suspension

Rectal, 360 grams in suitable suspension

lodophthalein Sodium (Soluble Iodophthalein, Tetraiodophthalein Sodium)

Action and Use.—This drug is used as a diagnostic agent to test the excretory function of the liver and to render the gallbladder opaque to X-ray. It is administered either orally or intravenously. All solutions for injection should be freshly prepared.

Dose Usual: I.V., 2 grams Dose Range: 2 to 4 grams

# Sulfobromophthalein Sodium

Action and Use.—Sulfobromophthalein sodium is used to test the functional activity of the liver and is considered more reliable than iodophthalein. It is administered by injection.

Dose Usual: I.V., 5 mg. (1/30 grain) per kg. of body weight

Dose Range: 2 to 5 mg.

Phenolsulfonphthalein (Phenol Red)

Action and Use.—This drug is used in renal function tests. It is administered intramuscularly or intravenously. The official injection is prepared by using sodium bicarbonate or sodium hydroxide as a solvent.

Dose Usual: I.V., I.M., 6 mg. (1/10 grain)

lodopyracet Injection (Diodrast Sterile Solution)

Action and Use.—Iodopyracet injection is used as a contrast medium in intravenous urography.

Dose Usual: I.M., I.V., 20 ml. Dose Range: I.V., 20 to 50 ml.

## FLAVORING AGENTS

The choice of flavoring agents, and combinations thereof, is almost unlimited. Almost any combination in respect to composition, color, odor, taste, solvent properties and stability may be obtained. Following is a list of official and unofficial substances available and frequently prescribed:

Aromatic Elixir

Aromatic Elixir, Red

Benzaldehyde.—A colorless liquid having an odor of bitter almond oil and a burning, aromatic taste.

Cacao (Cocoa).—The powder prepared from the roasted, cured kernels of the ripe seed of *Theobroma Cacao*.

Cacao Syrup

Cherry Juice.—The liquid expressed from the fresh, ripe fruit of *Prunus Cerasus*.

Coriander (Coriander Seed),—The dried ripe fruit of Coriandrum sativum.

Coriander Oil

Cyclamate Calcium.—A synthetic s-veetening agent for use by diabetics and others with restricted sugar intake. Non-toxic but excessive use produces laxative effect. Equivalent to 2 teaspoonsful of sugar is 1.25 ml. of a 15 percent solution of cyclamate calcium.

Cyclamate Sodium.—Similar to cyclamate calcium. Equivalent to 1 teaspoonful of sugar is 1.25 mg. of cyclamate sodium.

Fennel Oil

Fennel Water

Iso-Alcoholic Elixir

Lavender Oil (Lavender Flowers Oil).—The volatile oil distilled with steam from the fresh flowering tops of *Lavandula officinalis*.

Lavender Spirit

Lavender Tincture, Compound

Lemon Oil

Lemon Peel.—The outer, yellow rind of the fresh, ripe fruit

Lemon Tincture

Myristica (Nutmeg).—The dried, ripe seed of Myristica fragans, deprived of its seed coat and with or without a thin coating of lime. It has an aromatic odor and a pungent, aromatic taste.

Myristica Oil

Orange Flower Oil (Neroli Oil).—The volatile oil distilled from the fresh flowers of *Citrus Aurantium*.

Orange Flower Syrup

Orange Flower Water

Orange Oil, Sweet

Orange Peel, Bitter.—The dried rind of unripe fruit of Citrus Aurantium.

Orange Peel, Bitter, Elixir

Orange Peel, Bitter, Tincture

Orange Peel, Sweet.—The fresh outer rind of the non-artificially colored ripe fruit of *Citrus* sinensis. The inner, white portion of the rind should be excluded.

Orange Peel, Sweet, Tincture

Orange Spirit, Compound

Raspberry Juice.—The liquid expressed from the

fresh ripe fruit of varieties of Rubus idaeus or Rubus strigosus.

Raspberry Syrup

Saccharin (Gluside, Benzosulfimide).—White crystals or crystalline powder. Soluble 1 gram in 290 ml. of water and 31 ml. of alcohol. A 60 mg. portion of saccharin has sweetening power equivalent to about 30 gram of sucrose.

Saccharin Sodium (Soluble Saccharin).—Soluble 1 gram in 1.5 ml. water and 50 ml. alcohol.

Sarsaparilla.—The dried root of certain species of *Smilax*. It is nearly odorless and has a mucilaginous, somewhat sweet and acrid taste.

Sassafras.—The dried bark of the root of Sassafras albidum; yields about 4 ml. of sassafras oil from each 100 gram of drug.

Sassafras Oil

Spearmint (Garden Mint).—The dried leaves and flowering tops of *Mentha spicata*.

Spearmint Oil

Spearmint Spirit (Essence of Spearmint).—Dose Usual: 1.0 ml. (15 min.)

Spearmint Water

Vanilla (Vanilla Bean).—The cured full-grown, unripe fruit of *Vanilla planifolia*.

Vanilla Elixir, Compound

Vanilla Tincture

Vanillin.—Fine white or slightly yellow needlelike crystals, having an odor and taste suggestive of vanilla.

Vanillin Spirit, Compound

Wild Cherry (Wild Black Cherry Bark).—The stem bark of *Prunus serotina*. When the bark is moistened with tepid water, benzaldehyde and a small amount of hydrocyanic acid are formed. It is used chiefly as a flavor for cough syrups.

# **COLORING AGENTS**

Preparations which may be colored include most liquid pharmaceuticals, powders, ointments, and emulsions. The amount of coloring agent added should not be of a concentration sufficient to stain fabrics if spilled. Following is a list of certified agents:

Amaranth (F.D. and C. Red No. 2).—A dark, red-brown powder, soluble in 15 parts water and very slightly soluble in alcohol.

Amaranth Solution

Amaranth Solution, Compound

Caramel (Burnt Sugar Coloring).—A concen-

trated aqueous solution of the product obtained by heating sucrose or glucose until the sweet taste is destroyed and a uniform dark brown mass results, a small amount of alkali, alkaline carbonate, or mineral acid being added while heating. It is a thick, dark brown liquid, with a burnt sugar odor and a pleasant bitter taste.

Carmine.—The aluminum lake of the coloring principle obtained from cochineal; odorless and tasteless. It colors solutions red.

Carmine Solution

Cochineal.—The dried female insects of *Coccus* cacti enclosing the young larvae. The coloring principle is carminic acid, which yields a brilliant crimson color, becoming orange in acid solution and purplish in alkaline.

Cochineal Solution

# **SOLVENTS**

The most useful pharmaceutical solvents are the following:

Water.—Water is the most important generally used solvent. It can be depended upon to dissolve most of the common salts, whether these be inorganic or organic in nature. It also dissolves sugars, gums, mucilages, tannins, albuminous bodies, and proteins. Aqueous solutions are among the most important preparations of pharmacy and are represented in such preparations as solutions, waters, and syrups.

Alcohol.—As a solvent, alcohol ranks next in importance to water. It has a decided advantage over water in that preparations made with it will keep almost indefinitely. Alcohol dissolves alkaloids, neutral principles, resins, volatile oils; precipitates gums and most inorganic salts. Since many therapeutic inert principles like gum, albumin, and starch are insoluble in it, alcohol is all the more useful as a selective solvent. Mixtures of water and alcohol, in proportions to suit specific cases, are extensively used.

Glycerin.—Glycerin lies between water and alcohol in solvent properties, resembling the former more than the latter as a solvent. It is an excellent solvent for tannins, boric acid, gallic acid, phenol, cresol, creosote, iodine, and many of the metallic salts. It is not a solvent for resins, volatile oils or balsams, but will throw out less of these materials when added to their alcoholic solutions than will water in equal volume. It has a preservative action in higher concentrations.

Propylene Glycol.—Propylene glycol is a clear, colorless viscous liquid miscible with water, with acetone and with chloroform in all proportions. It is used as a substitute for glycerin. It is soluble in ether and will dissolve many essential oils, but is immiscible with fixed oils.

Isopropyl Alcohol.—This is a colorless, mobile, volatile liquid with a characteristic odor and bitter taste. It is used in a number of pharmaceutical operations in lieu of ethyl alcohol which has similar solvent properties. It has the advantage over ethyl alcohol in that it contains less water (not over 1 percent) as opposed to ethyl alcohol (5 percent). It is used as a solvent for extracting drugs. Not for internal use.

Ether.—Ether dissolves resins, volatile and fixed oils, fats and some alkaloids and neutral principles. It is one of the solvents used in making prepared oleoresins.

Petroleum Benzin (Petroleum Ether).—Petroleum benzin is similar in its solvent properties to ether except for the resins. It is a clear, colorless volatile liquid, having an etheral or faint petroleum-like odor. It is insoluble in water, miscible with ether, chloroform, and with fixed and volatile oils except castor oil. It is freely soluble in alcohol. It is used as a solvent for fats and is frequently used to remove fatty and waxy constituents from certain drugs prior to extracting the active principle.

Chloroform.—While chloroform bears the solvent properties of ether and petroleum benzin, it has a decided advantage over both, it is nonflammable.

Carbon Tetrachloride.—This solvent is a valuable nonflammable agent for fats, and oils.

Acetone.—Acetone is not an immiscible solvent but stands, in its solvent action, midway between alcohol and ether. It causes toxic symptoms similar to those produced by alcohol.

## SURFACE ACTIVE AGENTS

No effort has been made to cover all surface active agents. The following are offered only as a representative group.

Polysorbate 80 (Tween 80).—A lemon to amber, oily liquid, soluble in water and alcohol. It is used in pharmacy as an emulsifying agent.

Dioctyl Sodium Sulfosuccinate (Aerosol OT).— This is a white, waxlike plastic solid with a characteristic odor. It is very soluble in alcohol and in glycerin and dissolves slowly in water (1 gram in about 7 ml. of water). It is used as an emulsifying and a wetting agent.

Hydroxystearin Sulfate (SHCO, Sulfated Hydrogenated Castor Oil).—This is used as an emulsifying agent.

Sodium Lauryl Sulfate (Duponal C, Irium, Gardinol WA).—This is used as an emulsifying, detergent, and wetting agent. It is soluble, 1 gram dissolves in 10 ml. of water.

Stearyl Alcohol (Stenol).—Stearyl alcohol is used as an emulsifying agent. It is a mixture of solid alcohols, insoluble in water.

Medicinal Soft Soap (Soft Soap, Green Soap).—

Medicinal soft soap is a potassium soap made by the saponification of vegetable oils without removing the glycerin. This is a soft, unctuous, yellowish brown to greenish yellow translucent mass with a slight, characteristic odor.

Soft Soap Liniment (Tincture of Green Soap).—Soft soap liniment is used as a detergent for cleansing the area for an operation, also for washing the surgeon's and assistants' hands, for washing the scalp, and for other similar purposes.

Compound Soft Soap Liniment (Compound Green Soap Tincture).—This soft soap liniment is used as a detergent in skin and scalp diseases; contains juniper tar.

# REVIEW OF TOXICOLOGY

Toxicology is the science of poisons. It is concerned with the detection, isolation, and quantitative estimation of poisons, their chemical and physiologic effect on the ordinarily healthy organism, and the antidotes for their toxic effects.

A poison is a substance which may produce death, serious illness, or harmful effects when introduced into the body in a relatively small quantity.

The effects of poisons may be local or remote and some poisons have both a local and remote effect. Local effect means direct action on the part to which the poison is applied, such as corrosion and irritation; remote effect means the action of the poison on some organ remote from the seat of application or point of introduction. Sometimes, a poison shows no effect or only a slight one, until several doses have been taken. Then, suddenly, an effect is produced which nearly equals that produced by taking the whole amount at one time. This is known as cumulative effect.

The effect of a poison depends upon its solubility, the method of its introduction into the body, and the rapidity of its absorption into the system. The method of introduction may determine its toxicity. For example, snake venom taken into the mouth and perhaps even into the stomach during first-aid treatment of snakebite is not ordinarily harmful; but snake venom injected hypodermically is extremely poisonous.

There are various ways in which poisons may be introduced into the body, the most common being by mouth, inhalation, and injection. Poisons taken by mouth enter the circulation through absorption from the stomach and intestine and those inhaled enter the circulation through the air passages and lungs. When introduced by hypodermic injection or by injection into the urethral, rectal, or vaginal orifices, poisons enter the circulation through absorption from the body tissues. If the injection is intravenous, the poisons are introduced directly into the blood stream. Poisons may also be introduced by application to open wounds and to the unbroken

skin. After entering the circulation, a poison is carried by the blood to the tissues and organs susceptible to its action and attacks them.

Most of the excretion of poisons from the body takens place in the kidneys, lungs, liver, gastrointestinal tract, skin, and salivary glands. Poisons may be excreted from the system unchanged or in the form of other compounds into which they have been transformed by the action of the various body organs and tissues. The most damaging effects of some poisons are found at the points of excretion, as in the kidneys and colon in poisoning by mercuric chloride (bichloride of mercury).

Various conditions of the individual may modify the actions and effects of poisons on the body. The age of the person makes a great deal of difference, young children being far more susceptible to poisons than adults. Conditions caused by poisons will vary because of personal idiosyncrasy; that is to say, some persons by nature are unusually sensitive to certain poisons, while others possess a natural tolerance for certain poisons that is not the result of habitual use. Through habitual use of certain poisons, especially the narcotics, most persons may become so accustomed to their effects that they are not poisoned when taking doses that would ordinarily prove lethal in the unaddicted. It occasionally happens, however, that continual external use of chemical substances results in hypersensitivity.

The actions of poisons may be considerably modified by disease, some diseases increasing and others lessening the action of poisons. In the latter case, large doses are usually required to produce the desired effect.

Poisoning may be either acute or chronic. Acute poisoning is the condition brought on by taking one overdose of a poison. Chronic poisoning is the condition brought on by taking repeated doses of a poison or as the result of the absorption of the poison over a long period of time. Matchmakers, barometer and thermometer makers, painters, and wallpaper hangers are some of the occupational groups subject to chronic poisoning

from phosphorus, mercury, lead, and arsenic, respectively.

# CLASSIFICATION OF POISONS

### Gaseous Poisons

These poisons are present in the gaseous state and, if inhaled, destroy the capability of the blood as a carrier of oxygen and irritate or destroy the tissues of the air passages and the lungs. When in contact with the skin and mucous membranes, gaseous poisons produce lacrimation, vesication, imflammation, and congestion. Examples are carbon monoxide, carbon dioxide, hydrogen sulfide, sulfur dioxide, nitrous oxide (laughing gas), nitric oxide, ammonia gas, chlorine gas, bromine vapors, and war gases.

# Inorganic Poisons

Inorganic poisons fall into two classes: (a) Corrosives which are substances that rapidly destroy or decompose the body tissues at point of contact. Some examples are hydrochloric, nitric, and sulfuric acids in concentrated form; phenol; oxalic acid crystals; glacial acetic acid; sodium hydroxide; potassium hydroxide; lye (which is a technical grade of sodium or potassium hydroxide); and iodine. (b) Metals and their salts which are corrosive and irritant locally, but whose chief action occurs after absorption when they damage internal organs, especially those of excretion. Some examples are arsenic, antimony, bismuth, copper, iron, lead, mercury, radioactive substances, and tin.

## Alkaloidal Poisons

These poisons are nitrogenous plant principles which produce their chief effect on some part of the central nervous system. Some examples are aconitine (since this alkaloid is seldom employed in modern therapy, the interest here is chiefly toxicologic), atropine, cocaine, morphine, physostigmine (eserine), strychnine.

#### Nonalkaloidal Poisons

These poisons include various chemical compounds, some obtained from plants, having hypnotic, neurotic, irritant, and systemic effects. Some examples are the barbiturates, salicylates, trinitrotoluene (TNT), acetophenetidin, digitalis, castor oil, oleoresin of male fern, turpentine, cantharides, and aspirin.

### Food Poisons

Food poisoning comes from the ingestion of amino compounds which result from decomposition of protein or dead animal matter, or toxins produced by *Clostridium botulinum* in improperly canned foods.

# EFFECTS AND SYMPTOMS OF POISONS

For convenience of study, the following general classification of poisons according to their effects on the body and the general symptoms of poisoning will be used. In addition there will follow a table (Table II) entitled, *Poisons*, *Symptoms and Signs*, and Antidotes.

## Corrosives

Corrosives are substances which rapidly destroy or decompose the body tissues at point of contact. Note: See (a) under Inorganic Poisons, above.

General Symptoms.—Immediately there is burning pain in the mouth with severe burning pain in the esophagus and stomach. This is followed by retching and vomiting; the stomach contents are mixed with dark colored liquid and shreds of mucous membrane from the mouth, esophagus, and stomach. The inside of the mouth is corroded and the lips present a characteristic stam if an acid has been used. Swallowing is very difficult, respiration is impeded, the abdomen is tender and distended with gas, the temperature is high, and the facial expression shows anxiety and great suffering.

#### Irritants

Irritant poisons are those agents which do not directly destroy the body tissues but set up an inflammatory process at the site of application or contact. Some examples are potassium nitrate, zinc chloride, zinc sulfate, ferrous sulfate, silver nitrate, arsenic, iodine, and phosphorus.

General Symptoms.—Nausea, vomiting, and purging (frequently the vomited matter and stools contain blood); pain and cramps in the abdomen. In some cases, there is inflammation of the urinary tract.

#### Neurotics

Neurotics are poisons which act on the brain, spinal cord, and the central nervous system. Some examples are opium, hydrocyanic acid (prussic acid), ether, chloroform, aconite, nux vomica, bel-

ladonna, ethyl and methyl alcohol, and the barbiturates.

General Symptoms.—Symptoms may be divided into two subclasses:

1. Depressants, which produce symptoms characterized by a period of exhilaration followed by drowsiness and stupor; slow and stertorous breathing; cold, clammy skin; cyanosis; slow pulse; muscular relaxation; dilated or contracted pupils; and insensibility to external impressions.

2. Excitants, which produce symptoms characterized by rapid and feeble pulse; delirium; hot and dry skin; a sense of suffocation and the inability to breathe; shuddering and jerking of muscles; dilated or contracted pupils; disordered vision; and sometimes convulsions and tetany (as in the case of strychnine poisoning).

#### Gaseous Poisons

Poisons present in the gaseous state which if inhaled destroy the oxygen carrying property of the blood and irritate the tissues of lungs and air passages; or if in contact with the skin or mucous membranes, are highly irritating.

General Symptoms.—Irritation and corrosion of the respiratory tract, with resultant bronchitis (either mild or severe); irritation of the eyes, mouth, stomach and kidneys.

## Food Poisoning

Food poisoning can cause acute attacks of illness in more men in a short time than any other condition. The term *food poisoning* is conventionally divided into two types, food intoxication and food infection.

Food intoxication is due to a specific toxin produced outside the body, for example the toxin of botulism. Other organisms cause food intoxication by producing toxins the exact nature of which is imperfectly understood. These toxins are formed under suitable conditions usually by staphylococci, occasionally by streptococci, and rarely by coliform and proteus groups.

Food infection usually is caused by a specific group of organisms, namely the salmonella group, but occasionally by the dysentery group.

General Symptoms.—Gastrointestinal distress, nausea, vomiting, diarrhea, urticaria, circulatory and nervous disturbances are the general symptoms of food poisoning and they may vary from

mild discomfort to violent disturbances of the normal functions of the body. In more acute forms the neurologic symptoms may overshadow the gastrointestinal symptoms, followed by collapse. Death is usually due to respiratory paralysis, cardiac failure, or secondary pneumonia.

## TREATMENT OF POISONING

### Poison Control Centers

The United States Public Health Service has established a clearing house for poison information. Its chief purpose is to interchange information with the many local poison control centers established throughout the country. These centers have been established at major medical centers and operate on a 24-hour basis. Every medical facility should make an attempt to utilize the services of the poison control center contiguous to its activity.

At larger facilities of the United States Navy, it would appear desirable to set up centers for emergency poison treatment; these centers to operate on a 24-hour basis.

#### Basic Procedures

The basic procedure in treatment of poisoning is:

1. To get the bulk of the poison out of the stomach quickly. Removal of the poison from the stomach may be accomplished by the use of emetics (agents used to promote vomiting), and by washing out the stomach through use of a stomach tube (when not contraindicated).

2. To administer an antidote for the remainder

of the poison left in the stomach.

3. To eliminate from the system that portion of the poison which has been absorbed.

4. To treat the symptoms as they arise; and

5. To take possession of all foods, medicines, vomited matter, feces, urine and anything that may be of value in determining the identity of the poison and whether taken accidentally or intentionally, or whether criminally administered.

Cases of poisoning are frequently met with where the services of a physician or poison control center are unavailable. In these cases it often happens that it is impossible to obtain much or any information relative to the nature or type of poison taken. Since any delay in treatment may result in serious consequences, every hospital corpsman should possess some practical knowl-

edge of how to manage a poisoning case when the nature of the poison is unknown.

For the purpose of general treatment in unknown poisons, the case may be considered as one of two kinds. It may either be a case where the local effects of the poison have injured the mucous lining of the mouth, esophagus, and stomach to an extent contraindicating the use of instruments or emetics for evacuating the stomach; or, it may be a case where the poison has had but little or no local effect on the mucous lining of the alimentary tract, and therefore one in which it would be safe to use a stomach tube or an emetic.

Poisons coming under the classification of corrosives generally produce conditions such as mentioned in the first instance. They have a more or less injurious and even destructive effect on the lining of the mouth and stomach. Naturally in such cases the introduction of any sort of instrument, even a soft rubber stomach tube. may result in a perforation in the weakened wall. In such conditions, even rupture of the stomach may be caused by emesis. Poisons classified as irritants and neurotics have, generally, no special local or injurious action on the mucous membrane of the mouth and stomach and, therefore, in such cases, the stomach may be evacuated and washed with the aid of a stomach tube; or, in the absence of a stomach tube, emetics may be resorted to without fear of injury.

Even when the exact nature of the poison is unknown, one seldom finds it difficult to determine whether the offensive material is a corrosive or not; a corrosive leaves unmistakeable signs about the lips and mouth. When the local condition points to a corrosive poison, the evidence usually indicates also whether it is of the acid or alkali type. In the case of an acid, the general treatment is the same as that outlined for Acids in Table II, while the general treatment for almost any strong alkali is outlined under Alkalis. In neither case is the stomach tube or an emetic employed.

In cases where there are no signs of injury to the lining of the mouth, the probabilities are that the poison is one of the irritants or neurotics. That is, the poison may be a salt of one of the poisonous metals, such as arsenic, mercury, copper, tin, zinc, or silver. It may be one of the alkaloidal drugs such as opium, belladonna, nux vomica; or perhaps one of their many alkaloids, the most common of which are the alkaloids morphine, codeine, cocaine, heroin, atropine, and strychnine. In an unknown case it would hardly be strychnine, however, for the symptoms in a case of strychnine poisoning are very characteristic. The patient may be suffering from poisoning by one of the drugs known as glycosides of which the active principles of digitalis are examples; or, the case may be one of poisoning by grain alcohol, wood alcohol, chloral, a cyanide, phosphorus, iodine (leaves stains on lips), or phenol (the undiluted form has corrosive action), or the barbituric acid derivatives.

## Universal Antidote

Almost the entire range of possibilities for poisons coming under either the classification of *irritants* or *neurotics* may be treated with a general antidote having properties of precipitating them, or of physically or chemically combining with those poisons in a manner to reduce their toxicity and, in some instances, to convert them into altogether harmless compounds. The following is considered an excellent general antidote:

Activated Charcoal..... 2 parts (7.5 gram) Magnesium Oxide\*..... 1 part (3.8 gram) Tannic Acid........ 1 part (3.8 gram)

\*Milk of magnesia is 7% magnesium oxide.

The dosage of this antidote is 15 grams (½ ounce) in a half glass of warm water which is used to absorb or neutralize poisons. This mixture is useful in poisoning by acids, alkaloids, glycosides, and the heavy metals. It is to be followed by gastric lavage or an emetic except in the case of corrosive substances.

Emergency treatment and action taken should in general, conform to the following steps:

- 1. Determine the identity of the poison by symptoms, history, residue in glasses or other related sources of information.
- 2. Wash the stomach with lukewarm water or saline solution, between doses of the antidote. This treatment should be repeated at intervals of 10 minutes as long as may appear necessary. Occasionally, after washing out the stomach and between doses of antidote, give the patient a thin paste of starch, the white of two eggs, or other albuminous substance.

- 3. Always use the stomach tube unless contraindicated as in cases where strong alkalis, acids, corrosives or strychnine (convulsions) are suspected, or if the patient is comatose. The stomach tube facilitates the administration of antidotes as well as the washing out of the stomach at short and frequent intervals, and permits the handling of the case in a positive manner insofar as it places the administration of emergency treatment under control.
- 4. When the stomach tube is not used, the patient is required to assist and work on himself. He must swallow large volumes of antidotal mixtures, saline solution or warm water, and besides this he must take emetics to promote vomiting. All such efforts on the part of the patient have a tendency to weaken him and thereby lower his general resistance. However, when for any reason the stomach tube is not employed, antidotes must be taken by mouth and removed by emesis, which may in some cases be brought on by the tickling of the throat, but more often requires the use of emetics.
- 5. After removing the residual poison from the stomach by the use of the stomach tube or emetics, elimination may be accomplished by the use of certain cathartics, such as saline cathartics or castor oil, or by rectal irrigation. An ounce of 50 percent magnesium sulfate may be left in the stomach followed by a large quantity of water. Magnesium sulfate is helpful in cleansing the lower part of the bowel. No oils should be given unless it is certain that the patient is not suffering from an oil-soluble poison such as phosphorus or phenol.

No definite outline of treatment can be laid down for combating the possibilities that may arise from absorbed poisons; this part of the treatment is based on the symptoms which the case presents. Shock is an important factor to be considered. Intravenous administration of sodium chloride injection or glucose is helpful in restoring fluid balance. Medication should be limited to drugs with physiologic actions which are clearly understood by the hospital corpsman.

### Emetics

There are a number of drugs which produce nausea and vomiting as reactions from overdosage, but the number that may be used intentionally to cause the patient to vomit is relatively small. Vomiting may be stimulated by gagging or stroking the throat with the finger or a tongue depressor when the stomach is full of liquid.

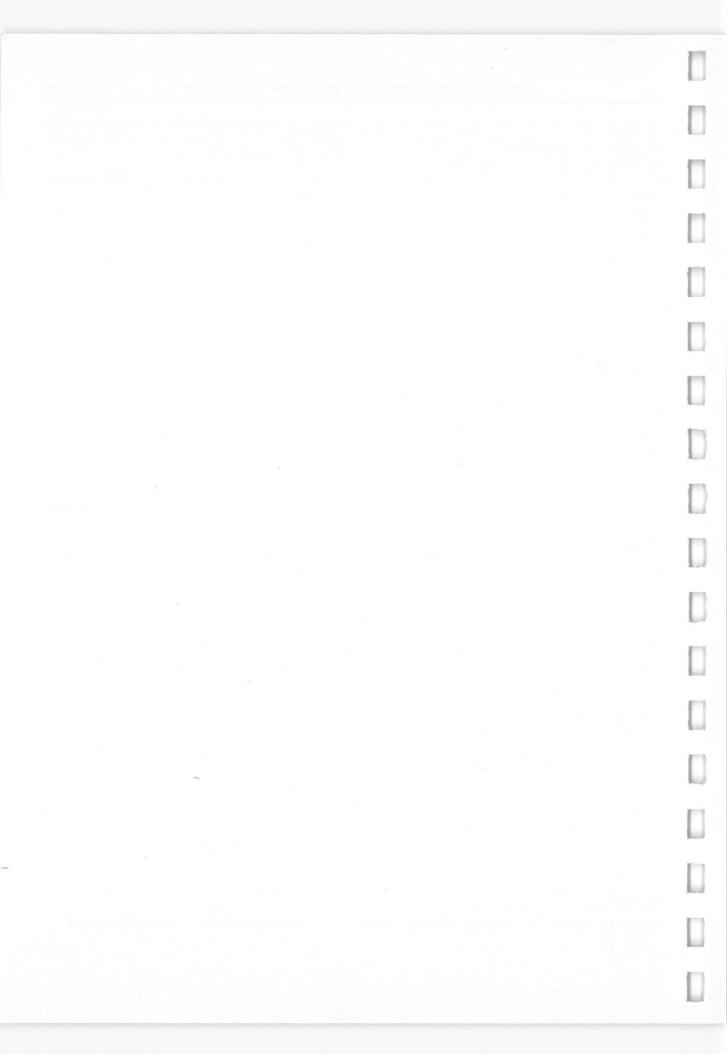
When an emetic is required the following may be considered:

- 1. One to 3 teaspoonsful of powdered mustard in a glass of warm water.
- 2. Warm, soapy water (also has antidotal action for a number of metallic salts, principally mercuric chloride).
- 3. Warm salty (2 teaspoonsful of table salt) water. (Fifteen grams (½ ounce) of sodium chloride in glass of warm water.)
- 4. Apomorphine hydrochloride 5 mg. (½ grain), injected subcutaneously. (Should be used with caution and never in morphine poisoning.)
  - 5. Zinc sulfate one gram (15 grains).
  - 6. Copper sulfate 0.3 grams (5 grains).
  - 7. Fluidextract of ipecac 0.5 ml. (8 minims).
  - 8. Large quantities of tepid water.

## ANTIDOTE LOCKER

The following are suggested to cope with poison emergencies. The list may be lengthened and it is very important that it be kept up to date and the drugs legibly labeled:

Acetic Acid Diluted Alcohol, Ethyl Amyl Nitrite Pearls Acetate Sodium Apomorphine Hydrochloride Tablets Aromatic Spirits of Ammonia Atropine Tablets or Injection Avertin Ampul B.A.L. in Oil (10%) (Dimercaprol) Caffeine and Sodium Benzoate Ampuls Calcium Edathamil (Ca EDTA) Calcium Gluconate Ampuls Charcoal, Activated Chloroform Copper Sulfate, Powdered Dextrose 50% Ampuls Ephedrine Ampuls Epinephrine Hydrochloride Ether Hydrogen Peroxide Limewater Lugol's Solution Magnesium Oxide or Milk of Magnesia



Methylene Blue Ampuls

Prostigmin Methylsulfate Injection

Mustard, Powdered

Nalorphine Ampuls (Nalline)

Neostigmine

Nikethamide Ampuls

Olive Oil Paraldehyde

Pentobarbital Sodium Ampuls

Physostigmine Salicylate

Picrotoxin Ampuls

Potassium Permangenate 1% solution to be

diluted 20 times and dated

Procainamide (Pronestyl)

Sodium Bicarbonate

Sodium Bicarbonate 5% solution

Sodium Chloride Sodium Citrate

Sodium Formaldehyde Sulfoxylate

Sodium Nitrite

Sodium Thiosulfate Ampuls (25%)

Starch

Tannic Acid Powder

Universal Antidote Mixture

Vitamin K Zinc Sulfate

Table II.—Poisons, Symptoms and Signs, and Antidotes

Poison	Symptoms and Signs	Antidotes
ACETANILID	Cyanosis, due to formation of methemo- globin; vertigo; skin reactions; headache; mental confusion; weakness; desire to sleep; death from circulatory or respir- atory collapse.	Gastric lavage or emetic if swallowed. Artificial respiration; oxygen. Stimulate with caffeine and sodium benzoate. 0.5 gram I.M. Blood transfusion. Methylene blue solution (1%) I.V. for methemoglobinemia.
ACETONE	Heavy inhalation or ingestion results in decreased respiration, pulse and tem- perature; stupor, and in extreme cases, death.	See Alcohol, Methyl.
ACIDS Hydrochloric Nitric Sulfuric Acetic Phosphoric Oxalic	Lips, mouth, tongue, and throat burned (dark-brown or black by hydrochloric and sulfuric acid, yellowish green to orange by nitric acid, brownish by acetic and oxalic acids); burning pain and destruction of tissues in mouth, throat, and stomach; vomiting; feeble pulse; difficult speaking and swallowing; cold clammy skin; shock; perhaps convulsions and coma in oxalic acid poisoning; collapse. Possible yellow stains on clothing in hydrochloric acid, and dark brown to red in oxalic acid poisoning.	Avoid stomach tube and emetics. Administer alkalis (magnesia, lime water, soap in copious amounts of water, and demulcents (white of egg, milk). General stimulants, external heat. Morphine (15 mg.) for pain.  Oxalic acid: never use stomach pump; induce vomiting immediately; give a dilute solution of any form of lime (plaster from wall) at once. Avoid salts of sodium and potassium. Inject I.V. 10 to 20 ml. of 5% calcium chloride, or 10 to 20 ml. of 10% calcium gluconate. External heat. Ammonia; caffeine and sodium benzoate 0.5 gram, I.M.; morphine (15 mg.) for pain.
Phenols Carbolic Acid Creosote Cresol (Lysol) Guaiacol	White burns about mouth, lips, tongue and throat. Burning pain in the mouth, throat, and stomach; vomiting (vomitus and breath reek with characteristic odor); headache; cyanotic or pale face; contracted pupils; rapid pulse; irregular, stertorous breathing; muscular weakness; subnormal temperature; patient rapidly becomes comatose, collapse.	Use stomach tube cautiously; lavage with sodium or magnesium sulfate, lime water, soap; and give demulcents (olive oil, preferably, milk, or egg white). Avoid mineral oil, alcohol or glycerin. Artificial respiration, oxygen; stimulation by caffeine and sodium benzoate, 0.5 grams, I.V.; ammonia; morphine (15 mg.) for pain.  Phenol may be removed locally by washing with alcohol.
Acetylsalicylic Acid	See Salicylates.	
Hydrocyanic Acid (Prussic)	See Cyanides.	

Table II.—Poisons, Symptoms and Signs, and Antidotes—Continued

Poison	Symptoms and Signs	Antidotes
ACONITE Aconitine	Pallor; salivation; tingling and numbness in mouth and fingers; burning in throat and stomach; nausea and vomiting; slow feeble and irregular pulse; rapid and shallow respiration; muscular weakness; cold clammy skin; difficult swallowing; impaired voice; cramps in extremities and possible tetanic convulsions; death from cardiac or respiratory paralysis.	Avoid emetics. With stomach tube lavage with tannic acid. Give tea, strong coffee. Stimulate with inhalation of aromatic ammonia; caffeine and sodium benzoate (0.5 grams), or atropine 0.4 mg. (1/150 grain) subcutaneously. Use artificial respiration, oxygen.
ALCOHOL Methyl	Initially: dizziness, headache; nausea and vomiting; dimness of vision, with befogging of the brain. Later: widely dilated pupils with ultimate blindness; weakened circulation; stupor; coma; delirium; convulsions; cold, clammy skin; subnormal temperature; death from paralysis of respiratory center.	Wash out stomach repeatedly with sodium bicarbonate (1 to 3%) solution, large volumes of fluid; I.V. injection of 5% sodium bicarbonate, not over 6 ml. per kg. of body weight. I.V. injection of 50 to 100 ml. of 50% solution of dextrose. Purgatives. Morphine (15 mg.) for pain; caffeine for stimulation. Combat acidosis with fluids, alkalis, and sodium lactate.
Ethyl and Isopropyl	Exhilaration; staggering gait; deep sleep with stertorous breathing; acute gastritis and profound depression. Delirium tremens frequently occurs after an alcoholic debauch.	Wash out stomach. Keep body warm, head cold. Give by slow I.V. injection, 50 ml. of 50% dextrose solution containing 15 units of insulin, 50 mg. of thiamin hydrochloride, and 50 mg. of nicotinamide. Caffeine and sodium benzoate, 0.5 gram I.M.; ephedrine sulfate, 25 mg. I.M. or subcutaneously. Carbon dioxide and oxygen. Paraldehyde, 4 to 15 ml. orally, or a barbiturate if patient is violent.
ALDEHYDES Formaldehyde (Formalin)	Intense irritation of the eyes, respiratory tract and mucous membranes of mouth, throat, and intestinal tract; vomiting and diarrhea; central nervous system depression; vertigo; coma. Severe acidosis may result.	Wash out stomach with dilute ammonia and ammonium acetate. Give egg white or milk, then gastric lavage with 0.1% ammonia water or emetic. Administer cardiac stimulants; oxygen. Morphine (15 mg.) for pain.
ALKALIS Lye Caustic Soda Potash Ammonia Lime	Strong soapy taste in mouth. Severe burning pain in mouth, throat and stomach. Early violent vomiting with blood and mucus in vomitus. Mucous membrances become swollen and white; lips and tongue swell; throat may become constricted. Respiration difficult; skin cold and clammy. Pulse rapid; violent purging. Great anxiety.	Avoid stomach tube and emetics; neutralize with weak solution of acid (vinegar, lemon juice, or grapefruit juice). Give milk, egg white or other demulcents. Morphine (15 mg.) for pain. Stimulants, caffeine and sodium benzoate 0.5 gram I.M.  In surface burns, wash with large amounts of cold water; burns on eye, with borid acid solution.
AMYL NITRITE	See Nitrites.	and the second s

Table II.—Poisons, Symptoms and Signs, and Antidotes—Continued

Poison	Symptoms and Signs	Antidotes
ANESTHETICS Chloroform Ether	General central nervous system depression.	Maintain free airway. If drug swallowed evacuate stomach; wash out with sodium bicarbonate solution and give demulcents. Administer 95% oxygen with 5% carbon dioxide, use respirator Caffeine and sodium benzoate (0.5 gram) I.M. Atropine (0.5 mg.) subcutaneously.
ANILINE	See Acetanilid.	
ANTIMONY	Very similar to arsenic; shock is outstanding feature of acute antimony poisoning.	Gastric lavage with warm tannic acid solution or tea. Give dimercaprol as in arsenic poisoning. (See Arsenic.) Give demulcents (milk, egg white) or magnesium oxide. Caffeine, atropine, morphine. External heat.
ANTIPYRINE Aminopyrine	Skin eruptions; excitement; delirium; convulsions. Agranulocytosis; fever; malaise; throat ulceration.	See Acetanilid.
ARSENIC Arsenious Acid Fowler's Solution Paris Green	Faintness and depression come on in about one-half hour; intense pain in the region of the stomach; tenderness of abdomen on slight pressure; nausea and vomiting increase by every act of swallowing; purging, bloody stools; cold, clammy skin; feeble, rapid pulse.	Gastric lavage with warm water. Salines followed by castor oil Give dimercaprol (BAL, British Anti-Lewisite) in doses of 3 mg. per kg. of body weight by I.M. injection every 4 hrs. for first 2 days, then every 6 hrs. on third day, thereafter for 10 days every 12 hrs. or until recovery. Morphine (15 mg.) for pain.
ATROPINE	See Belladonna and derivatives.	
BARBITURATES Barbital Phenobarbital Other Barbituric Acid derivatives	Respiration shallow and slow; weak rapid pulse; fall in body temperature; moist, cold, cyanotic skin; stupor, coma, general nervous system depression.	Evacuate stomach, large volumes of fluid.  Magnesium sulfate purge, and diuretics. Picrotoxin, 10 mg. I.V. every 10 to 30 minutes until patient improves. CAU- TION: Picrotoxin is extremely potent— watch for signs of convulsions. Ad- minister ephedrine, ¾ grain I.M. Ad- minister atropine, 0.5 mg. for pulmonary edema. Ammonia; caffeine and sodium benzoate 0.5 grams I.V. Apply external heat.
BARIUM (Soluble Salts)	Powerful muscular stimulation; vomiting, severe colic and diarrhea; hemorrhage; death usually results in a short time.	Evacuate stomach; lavage with magnesium or sodium sulfate solution; follow with milk or other demulcents. Morphine (15 mg.) for pain.
BELLADONNA GROUP Atropine Hyoscyamine Stramonium Scopolamine	Redness or rash of the skin, skin hot and dry; nose, throat and bronchi dry; voice hoarse; swallowing difficult; pulse full and bounding, later feeble and rapid; pupils dilated, vision disordered; pre-disposition to laugh and talk loudly. There may be wild and maniacal delirium, or mental depression; suppression of the urine; convulsions. Death usually occurs from asphyxia.	Gastric lavage with tannic acid solution or emetic. Pentobarbital sodium, 0.2 gram, I.V. for excitement and delirium. Pilocarpine hydrochloride, 10 mg. subcutaneously. Hot and cold applications. Morphine (15 mg.), if needed for pain.

Table II.—Poisons, Symptoms and Signs, and Antidotes—Continued

Poison	Symptoms and Signs	Antidotes
BENZENE (Benzol)	See Solvents.	
BENZIN	See Petroleum.	
BROMIDES	Chronic: dermatitis; mental dullness, apathy, mental and neurologic disturbances; nausea.	Discontinue drug; give sodium chloride by mouth, 4 to 10 grams daily, to hasten excretion. Fluids, at least 4,000 ml. daily. Stimulate with caffeine and sodium benzoate, 0.5 gram subcutaneously or I.V. Oxygen. Calm with barbiturates, normal doses.
BROMINE	See Chlorine.	
CANNABIS (Marijuana)	Mental confusion involving exhilaration and depression; hallucinations, deli- rium, mania; drowsiness; muscular weakness; dilated pupils; rapid pulse; slow respiration; convulsions.	Evacuate stomach; give tannic acid solution. Ammonia; caffeine and sodium benzoate 0.5 grams I.M.; atropine (0.5 mg.); oxygen; artificial respiration.
CARBOLIC ACID	See Acids, Phenols.	•
CARBON DIOXIDE GAS	See Gases.	
CARBON MONOXIDE GAS	See Gases.	
CARBON TETRACHLORIDE Cleaning Fluids	See Solvents.	
CHLORAL HYDRATE	Deep stupor; marked vasodilation; low blood pressure; fall in body temperature; slow respiration; cyanosis.	Evacuate stomach and wash out with tea or coffee; intravenous administration of 10 to 20 mg. of picrotoxin. CAUTION: Discontinue picrotoxin if convulsions ensue. Apply external heat. Caffeine and sodium benzoate, 0.5 gram, I.M. Artificial respiration.
CHLORINE Bromine Chlorinated Lime Chlorine Water	Irritant gases produce irritation and corrosion of the respiratory tract causing bronchitis, which may be more or less severe. Irritation of the eyes, mouth, stomach, and kidneys also result.	By inhalation.—Remove patient from source of gas; give inhalations of ammonia and begin artificial respiration at once. Infusions of salt solution during initial period of blood concentration.  By mouth.—Gastric lavage with boiled starch or albumin solutions. Morphine (15 mg.) for pain; cardiac and respiratory stimulants. Caffeine and sodium benzoate 0.5 grams subcutaneously or I.V. When respiration is established, give magnesium oxide or dilute alkalis. Treat also as for bromide poisoning.
CHLORDANE	See DDT.	
CHLOROFORM	See Anesthetics.	
COCAINE AND SUBSTITUTES	Dilated pupils; talkativeness; sweating; restlessness, excitement, delirium, hallucinations, mania, followed by depression; nausea, vomiting; numbness and tingling in hands; headache, dizziness; small, rapid pulse; irregular respiration; later, convulsions, collapse, cyanosis, shock, possibly death from respiratory failure.	If drug was taken by mouth, give tannic acid solution then remove with stomach tube. For convulsions, pentobarbital sodium 0.2 gram I.V. or other shortacting barbiturates. For fainting, inhalations of aromatic spirits of ammonia or, orally, 1 teaspoonful in water Artificial respiration and oxygen CAUTION: Avoid morphine.
CODEINE	See Opium.	
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Table II.—Poisons, Symptoms and Signs, and Antidotes—Continued

Poison	Symptoms and Signs	Antidotes
COPPER SALTS Copper Sulfate (Blue Vitriol) Acetoarsenite	Copper taste in mouth; astringent action on throat; vomiting, thirst and purging with greenish stools; severe abdominal pain; tetanic spasms; delirium; paralysis; collapse.	Empty stomach by lavage of 5% solution of sodium thiosulfate. Give demulcents and magnesia. Apply external heat Stimulants. Morphine (15 mg.) for pain.
CROTON OIL	Severe gastroenteritis.	Evacuate stomach; follow with demulcents. Stimulate with ammonia; caffeine and sodium benzoate 0.5 gran I.M. Morphine (15 mg.) for pain.
CYANIDES Hydrocyanic Acid (Prussic Acid) (Fumigating Gas) Bitter Almond Oil Chokeberries	With large doses death is almost instantaneous. With small doses the victim may present cyanotic face; clenched teeth; open and staring eyes; perhaps bloody froth on lips; slow, labored, and gasping respiration; slow pulse; disturbed mental activity; dilated pupils; vomiting; general convulsions with involuntary defecation and urination; coma, followed by death from paralysis of respiratory center. Odor of bitter almond on breath.	<ol> <li>Prepare syringe with 10 ml. (0.3 gram) sodium nitrite while assistant No. 1 washes out stomach and assistant No. 2 gives amyl nitrite by inhalation (once every 3 minutes).</li> <li>Inject sodium nitrite I.V. while assistant No. 2 discontinues amyl nitrite inhalation and prepares 50 ml. syringe with sodium thiosulfate (12.5 grams in 50 ml.).</li> <li>Inject 50 ml. of thiosulfate solution I.V. while more amyl nitrite is given if needed.</li> <li>If relapse occurs, repeat treatment, using one-half these amounts. If nitrite shock occurs, give epinephrine, 1:1,000 solution. NOTE: Give oxygen.</li> </ol>
DDT (CHLORINATED ORGAN-IC INSECTICIDE)  DDT (Dichloro-Diphenyl-Trichloroethane)  TDE (Tetrachloro-Diphenyl-ethane)  Chlordane	Sensory disturbances, staggering gait; nausea; vertigo; headache; cold, clammy skin; numbness and partial paralysis of extremities; delirium; convulsions; respiratory arrest.	Emetics or gastric lavage, saline laxatives. Avoid oily laxatives, and epinephrine. Short-acting barbiturates (pentobarbital, 1½ to 3 grains I.V.) for convulsions. Calcium gluconate, 4 to 10 ml. of 10% solution given I.V. Quiet and rest. High-protein and high-glucose diet, and vitamin B <sub>12</sub> for liver damage. Adequate fluid intake.
DIGITALIS Digitoxin Digoxin Lanatoside C. Red Squill	Pulse slow and full, then rapid and irregular; nausea, persistent vomiting, colic, and purging; thirst; vertigo and disturbances of vision and hearing; headache; muscular weakness; respiration rapid and feeble; cyanotic skin; coma and convulsions. Death occurs from cardiac paralysis.	Tannic-acid-solution lavage; magnesium sulfate; ammonia; caffeine and sodium benzoate 0.5 gram I.M.; morphine (15 mg.) for pain; give atropine in 365-grain doses as needed to combat bradycardia. Horizontal position for several days even after improvement, as exertion may prove fatal.
ERGOT AND DERIVATIVES	Vomiting, diarrhea, unquenchable thirst; itching, tingling, coldness of skin; weak and rapid pulse; disturbed vision; confusion and unconsciousness.	Repeated gastric lavage; purgation with magnesium sulfate (15 grams). Vasodilators such as papaverine (3 grains), and amyl nitrite (0.3 ml.).
ESERINE	See Physostigmine.	

Table II.-Poisons, Symptoms and Signs, and Antidotes-Continued

Poison	Symptoms and Signs	Antidotes	
ETHER	See Anesthetics.	12 Jack	
FORMALDEHYDE	See Aldehydes.	Property of the control of the contr	
FOOD POISONING	Sudden onset of nausea followed by vomiting, abdominal cramps and diarrhea (blood and mucus present in severe cases). Severe vomiting and diarrhea may result in dehydration and shock. Headache and muscle and nervous irritability may be prominent. Death may occur from respiratory paralysis or secondary pneumonia.	ramps and diarpresent in severe acid-base imbalance, anuria: I.V. infusions of 5% glucose in isotonic saline (500 ml.). If shock ensues: blood or a blood volume expander. Vomiting controlled by atropine 1.0 mg. (\(\frac{1}{1}\)00 grain) hypodermically; or chlorpromazine (25)	
GASES Carbon Dioxide	Headache, dizziness; dyspnea; irritation of nasal passages; palpitation; mental clouding; dimness of vision; muscle tremor; tingling; cold extremities; mental depressions; fall in blood pressure; coma, generally without convulsions.	Remove from foul atmosphere; give oxygen, fresh air; apply friction and heat to extremities. Stimulants if necessary. Artificial respiration. Maintain treatment continuously if recovery has occurred after a long period of unconsciousness.	
Carbon Monoxide	Headache, dizziness; weakness; nausea and vomiting; swooning or collapse; increased respiration and pulse. (All of these symptoms may be absent before unconsciousness.)	Remove patient from foul atmosphere; give pure oxygen, fresh air (avoid chilling); blood transfusion. Keep patient warm and quiet. Artificial respiration, rest.	
Irritant Gases	See Chlorine.	Control of the contro	
HYOSCYAMINE	See Belladonna Group.	7 (2) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1	
INSECTICIDES	See DDT.	79-9-60 28-7-00	
IODINE	Acid taste in mouth; pain and sense of great warmth in throat; severe pain in esophagus, stomach, and abdomen with violent vomiting and purging (vomitus may contain traces of iodine). Lips and oral mucous membranes corroded and stained a dark brown; intense thirst; rapid, feeble pulse; face pale; suppression of urine; convulsive movements and collapse.	Gastric lavage with solution of soluble starch or flour, or 1 to 5% sodium thiosulfate solution. Demukents. Stimulants. Morphine (15 mg.) for pain. Give abundant fluids.	
LAUDANUM	See Opium.		
LEAD SALTS Lead Acetate White Lead	A sense of constriction about the throat; sweetish, metallic taste in mouth; cramps; stiffness of abdominal muscles; blue line around the gums; paralysis of upper extremities; dropped wrist; vomiting of white flaky matter and and constipation.	Give 4 or 5 grams sodium citrate dissolved in 30 ml. of water, 3 or 4 times daily by mouth, until lead excretion falls to normal. For severe colic, give 50 ml. of 2.5% sodium citrate solution I.V. In acute poisoning by ingestion, evacuate stomach; give cathartics and demulcents.	
MARIJUANA	See Cannabis.		

Table II.—Poisons, Symptoms and Signs, and Antidotes—Continued

TABLE 11. 1 Officers, Symptoms and Styles, and Antidotes—Continued		Annuoles—Continued
Poison	Symptoms and Signs	Antidotes
MERCURY Bichloride (Corrosive Sublimate) Merthiolate	Acrid metallic taste in mouth; salivation; thirst; burning pain in mouth, throat, and abdomen; nausea and vomiting of bloody material; straining to empty bowels or bladder; purging with mucus and blood in stools; suppression of urine; shock; and collapse. Face flushed; quick irregular pulse; cold extremities. Mucous membranes of lips, mouth, tongue, and throat may appear shriveled and white.	every 4 grains of bichloride of mercury taken.  2. Wash out stomach with 5% solution of sodium formaldehyde sulfoxylate. Allow 6 or 7 oz. to remain (or use 1 gram of sodium hypophosphite, 10 ml. of water, and 5 ml. of hydrogen
METHYL SALICYLATE (Oil of Wintergreen)	See Salicylates.	
MORPHINE	See Opium.	
MUSHROOMS, Poisonous Muscarine	Abdominal pain, vomiting, diarrhea; after 24 hours or more, cyanosis and cold, clammy skin, convulsions and coma. Excessive salivation; lacrimation; profuse sweating followed by violent retching, vomiting, diarrhea, dyspnea, confusion, hallucinations. Pupils are contracted but do not react to light and do not accommodate (diagnostically important).	Tannic acid and charcoal suspension; evacuate stomach; wash out with sodium or magnesium sulfate. Atropine (0.5 mg.) repeatedly for muscarine. Treat shock. Barbiturates to combat excitement. Alternate I.V. administration of 10% dextrose solutions with hypertonic saline.
NICOTINE (Black Leaf 40)	Burning sensation in upper gastrointestinal tract; salivation; nausea, vomiting, diarrhea; stimulation followed by paralysis of central nervous system.	Tannic acid, gastric lavage, or emetics. Symptomatic stimulation with ephedrine sulfate, 30 mg. I.M. Avoid strychnine. Artificial respiration to counteract paralysis of respiratory muscles. Cold to head; external heat.
NITRITES Amyl Nitrite Nitroglycerin	Severe headache, drowsiness; vomiting, colicky pains, diarrhea; flushed face; dizziness; dyspnea; cyanosis; convulsions, delirium, coma; respiratory paralysis.	Gastric lavage and purgation by magnesium sulfate. For methemoglobinemia, methylene blue, 6 ml. of 1% solution I.M. followed by 1 or 2 grains daily by mouth. Caffeine and sodium benzoate (0.5 gram.) I.V.; ephedrine (30 mg.) I.M.
NUX VOMICA	See Strychnine.	

Table II.—Poisons, Symptoms and Signs, and Antidotes—Continued

Poison	Symptoms and Signs	Antidotes
OPIUM Codeine Heroin Laudanum Morphine Paregoric	Usually there is a period of mental exhilaration and physical ease with quickened pulse. This is followed by dizziness, drowsiness, languor, and nausea; slow weakened pulse; slow stertorous breathing; cold clammy skin; cold extremities; muscular relaxation; eyanosis; livid countenance; pupils contracted (pinpoint) but may dilate just before death; insensibility to external impressions; deep sleep from which, if the patient is aroused, there will be an irresistible predisposition to go back to sleep. Death occurs by paralysis of the respiratory center.	Evacuate stomach; lavage with potassium permanganate (1:1,000 solution). Subsequent doses, 2 grains in 4 oz. of water. Keep warm and awake; stimulate with caffeine and sodium benzoate (0.5 grams). Inhalation of oxygen and 5% or 10% carbon dioxide is important. Artificial respiration or respirator; coffee, atropine (not more than 1/40 grain). Nalorphine hydrochloride 5 mg. to 40 mg. subcutaneously. Empty bowels with saline cathartics.
OXALATES	See Acid, Oxalic.	
PETROLEUM Kerosene Gasoline Petroleum Benzin	When the fumes or vapors are inhaled there is first dizziness, nausea, vomiting, constriction of the throat, headache, staggering and trembling of the hands and arms (the so-called "naphtha jag") and later, partial or complete insensibility, slow respiration, weak and scarcely perceptible pulse, convulsions, and death. There is a tendency to mania during return to consciousness in cases recovering from the poisoning.  If swallowed, there is shortness of breath, cyanosis, cold clammy skin, coma, and death.	When inhaled: Fresh air, no emetic, no stomach tube; otherwise as when swallowed.  When swallowed: Gastric lavage or emetic, followed by washing the stomach with very dilute potassium permanganate solution, then with warm water. It is advisable to administer two ounces of a solution of magnesium sulfate before withdrawing the stomach tube. Symptomatic stimulation, oxygen, external heat, artificial respiration. Morphine (15 mg.) for pain.
PHENOLS	See Acids.	
PHOSPHORUS Rat and Roach Paste Matches Fireworks	Gastric disturbances may not be present but generally are. These are manifested as nausea, thirst, abdominal pain, and vomiting material which is luminous in the dark, varying stupor and prostration.	Copious and repeated lavage with copper sulfate, ½% solution, followed by potassium permanganate, 1:1,000; or dilute hydrogen peroxide. Give mucilaginous drinks and 50 grams magnesium sulfate Intravenous dextrose, calcium salts, and glycine. Morphine (15 mg.) for pain caffeine and sodium benzoate 0.5 gram I.M., and oxygen inhalations. CAU TION: For several days avoid in die all edible oils, fats, or substances con taining them, e.g., milk, since these promote absorption of phosphorus.
PHYSOSTIGMINE (Eserine)	Vomiting, epigastric pain; dyspnea; gid- diness; muscular weakness and twitch- ing; pupillary contraction; sweating; salivation.	Give at once 1.0 mg, atropine sulfate sub cutaneously or I.M, then gastric lavage with tannic acid solution. Emetics CAUTION: Do not use apomorphine Keep warm. Artificial respiration.
PICROTOXIN	Epigastric pain, nausea, vomiting, diarrhea; salivation; weakness; sweating; headache; coma; clonic convulsions at 2-minute intervals.	Wash out stomach freely with 0.1% potassium permanganate. Control convulsions by slow intravenous injections of barbiturates such as pentobarbital so dium 5 to 12 grains I.V. If not avail able, give paraldehyde 1 to 4 ml. I.M. Artificial respiration with oxygen and carbon dioxide.

Table II.-Poisons, Symptoms and Signs, and Antidotes-Continued

Poison	Symptoms and Signs	Antidotes
PILOCARPINE	Salivation; lacrimation; sweating, and flushing of skin; pupillary contraction, visual disturbances in accommodation. Intestinal disturbances, persistent purging, nausea and vomiting; hallucinations; convulsions; cyanosis; respiratory collapse.	At once, 1.0 mg. (1/60 gr.) atropine sulfate subcutaneously or I.M. Gastric lavage with potassium permanganate 0.1% solution. Chloral hydrate; ammonia; artificial respiration; oxygen.
POTASSIUM PERMANGANATE	Corrosive gastroenteritis with a brownish black incrustation of the mucous membrane. Sometimes acute pharyngitis and edema of the glottis.	Induce vomiting with emetics, or gastric lavage with dilute hydrogen peroxide (10 ml. of 3% hydrogen peroxide in 100 ml. water) if corrosion is not too severe. Demulcents (egg whites, oils). Combat collapse and shock.
RODENTICIDES		
Sodium Monofluoroacetate (1080, Ten Eighty)	difficulty in swallowing; cardiac weak- ness; dyspnea; sensory and motor dis- turbances; epileptoid manifestations; renal irritations; anemia; increased coagulability of blood; death from shock or, later, from acidosis.	Immediate emesis and gastric lavage with lime water. Administration of substances capable of supplying acetate ions, choice drugs are monoacetin (glyceryl monoacetate), 2 to 4 grams/kg. of body weight, and a combination of sodium acetate and ethanol, 2 grams/kg. of each. Give 10 ml. of 10% calcium gluconate I.M. A single dose of magnesium sulfate (800 mg./kg.) I.M., as a 50% solution. Complete quiet and rest.
Warfarin	Widespread hemorrhages and reddish eruptions.	Teaspoon of salt in glass of warm water and repeat until vomitus is clear. Vitamin K therapy is valuable up to a point (65 mg. repeated 3 times a day, followed by smaller doses until prothrombin time is normal). Whole-blood transfusions; keep patient quiet. Treat for shock if indicated.
SALICYLATES		
Acetylsalicylic Acid (Aspirin) Methyl Salicylate (Oil of Winter- green) Sodium Salicylate Phenyl Salicylate (Salol)	Vomiting (wintergreen odor, if methyl salicylate is agent), inflammation of upper gastrointestinal tract and pain; rapid pulse and feeble, blood pressure low; pallor; ringing in ears; sweating; dimness of vision; confusion and mental dullness.	Gastric lavage with warm 5% sodium bicarbonate solution. Force fluids to increase urinary output. Sodium bicarbonate or sodium lactate M/6, I.V., to combat acidosis and sodium loss. Artificial respiration or respiratory stimulants. Apply external heat. Keep patient quiet. Demulcents to relieve pain and irritation (avoid oils). Supportive and symptomatic treatment.
SCOPOLAMINE	See Belladonna Group.	
SILVER SALTS		
Argyrol Silver Nitrate	Throat and abdominal pain; vomiting and purging of black or blood-stained material. Vertigo; spasms; coma; shallow respiration; convulsions; circulatory collapse. Mouth and lips stained graywhite, then black.	Common salt and water, as lavage or emetic. Follow with eggs and milk. Morphine (15 mg.) for pain.

Table II.—Poisons, Symptoms and Signs, and Antidotes—Continued

Poison	Symptoms and Signs	Antidotes
SOLVENTS Benzene Benzol Toluol Xylol	Burning throat; skin irritation (exposed parts); flushing of face; cyanosis of extremities; dizziness; restlessness, excitement, delirium, hallucinations; fever; convulsions; coma.	If inhaled, fresh air and change of clothing if it is contaminated. If ingested, wash out stomach with warm water. Artificial respiration, oxygen and carbon dioxide; caffeine and sodium benzoate (0.5 gram) I.M. Later: blood transfusions.
Carbon Tetrachloride	Warmth in stomach; inebriation; hiccup; headache; dilated pupils; abdominal pain, nausea and vomiting, diarrhea; respiratory paralysis or cardiovascular collapse; convulsions; death.	Remove from vapor; or if ingested, wash out stomach with warm water. Respirator with oxygen and carbon dioxide; stimulate symptomatically. Saline cathartics; dextrose, 100 ml. of 50% solution, and calcium gluconate, 10 ml. of 10% solution I.V. Blood transfusion. CAUTION: Avoid alcohol.
STRAMONIUM	See Atropine.	
STRYCHNINE Nux Vomica	A sense of suffocation and inability to breathe; shuddering and jerking of the muscles; sense of stiffness about the neck; twitching and jerking of lower limbs and quivering of entire body. Convulsions—the body becomes rigid and bent forward or backward, or to one side, resting on the heels and head only. The features assume a peculiar, stiff grin called risus sardonicus. During convulsions there is cyanosis; weak, rapid pulse; dilated pupils. Between convulsions there is general relaxation, sweating, weariness, drowsiness. Convulsions are induced by noise, drafts of air, jarring, or sudden, bright light. Patient remains conscious until the end and is fully aware of what goes on about him.	Administer short acting barbiturate I.V., pentobarbital sodium 0.3 gram. CAUTION: Do not use stomach tube until barbiturate has relieved convulsions. Gastric lavage with potassium permanganate (1 pint warm 1:1,000 solution), iodine (15 drops of tincture in ½ glass of water), or tannic acid solution (1 teaspoonful in ½ glass of hot water). Remove immediately from stomach with tube.  Horizontal position in darkness and absolute quiet. If convulsions recur, repeat slow I.V. injection of barbiturate. Artificial respiration, oxygen.
TURPENTINE	Sensation of warmth; abdominal pain, vomiting and diarrhea; blood, scant urine (violet odor); incoordination; excitement, convulsions, coma; respiratory paralysis, death.	Empty and wash out stomach; demulcents (white of egg, milk, cream); morphine (15 mg.) for pain; symptomatic stimulation.
VERATRUM Veratrine	Symptoms similar to aconite poisoning except for redness of skin with intense itching; sweating; pupillary dilation; loss of vision; dyspnea. Death from respiratory paralysis or cardiac collapse.	Avoid emetics; wash out stomach with tannic acid solution and purge with magnesium sulfate. External heat, fresh air. Caffeine and sodium benzoate, 0.5 gram I.M.; ammonia; atropine, 0.4 mg. (1/150 grain) subcutaneously for stimulation. Artificial respiration, oxygen.
WARFARIN	See Rodenticides.	
ZINC SALTS Zinc Chloride Zinc Sulfate	Corrosion of gastrointestinal tract; salivation, difficulty in swallowing, metallic taste in mouth; bloody vomitus; purging and bloody fecal material; collapse and death.	Give tannic acid solution, evacuate stomach and wash with sodium bicarbonate solution, or lime water, soap, mucilaginous drinks, or milk. Apply external heat. Give morphine (15 mg.) for pain. Treat shock. Stimulate with atropine 0.5 mg. (1/120 grain) subcutaneously, and caffeine and sodium benzoate 0.5 grams I.M.

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# Acknowledgments

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#### References

- American Drug Index. J. B. Lippincott Company, Philadelphia, 1957.
- Beckman, Harry: Drugs, Their Nature, Action and Use. W. B. Saunders Company, Philadephia, Pa., 1958.
- Goodman, L., and Gilman, A.: The Pharmacological Basis of Therapeutics. Macmillan Company, New York, 2d edition, 1955.
- Handbook of the Hospital Corps, United States Navy. Government Printing Office, Washington, D.C., 1939, 1953.

- Kaye, Sidney: Handbook of Emergency Toxicology. Charles C Thomas, Springfield, Ill., 1954.
- Krantz, J. C., Jr. and Carr, C. J.: The Pharmacologic Principles of Medical Practice. Williams & Wilkins Company, Baltimore, 3d edition, 1954.
- Krug, E. E., and McGuigan, H. A.: Pharmacology in Nursing. C. V. Mosby Company, St. Louis, 7th edition, 1955.
- New and Nonofficial Drugs, J. B. Lippincott Company, Philadelphia, 1958.
- Oldham, F. K., Kelsey, F. E., and Geiling, E. M. K.: *Essentials of Pharmacology*. J. B. Lippincott Company, Philadelphia, 3d edition, 1955.
- Pharmacopeia of the United States. Mack Publishing Co., Easton, Pa., 15th revision, 1955.
- Remington's Practice of Pharmacy. Mack Publishing Co., Easton, Pa., 11th edition, 1956.
- The Merck Manual of Diagnosis and Therapy. Merck and Co., Rahway, N.J., 9th edition, 1956.
- The National Formulary. J. B. Lippincott Company, Philadelphia, 10th edition, 1955.

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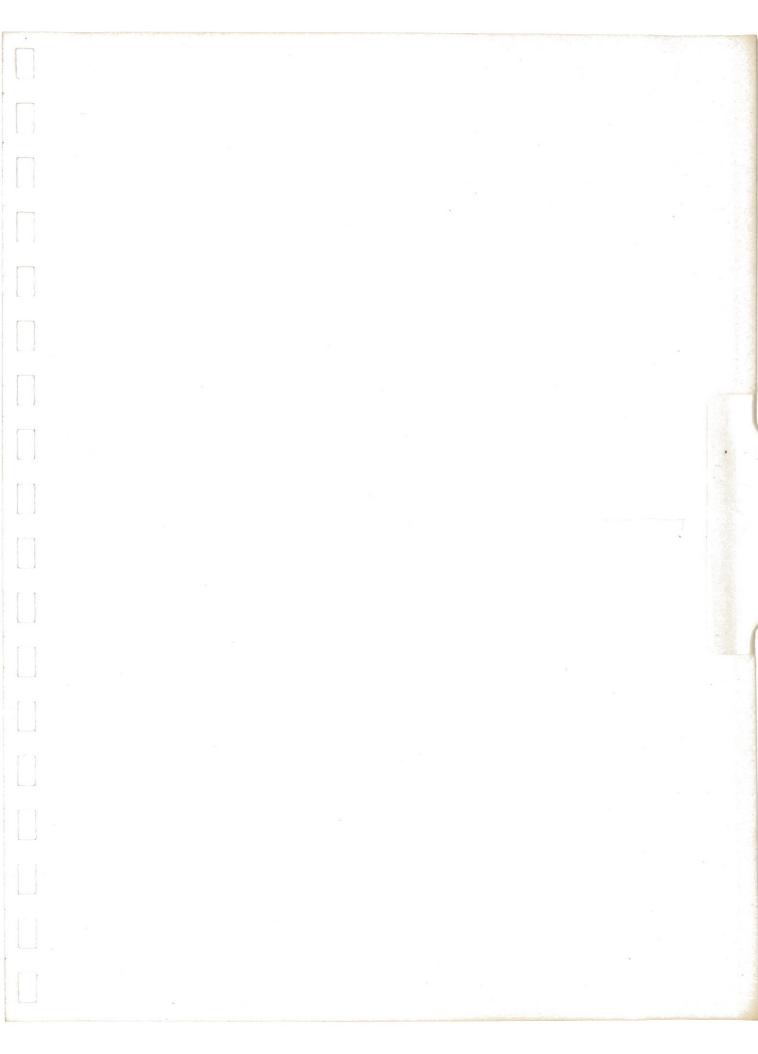
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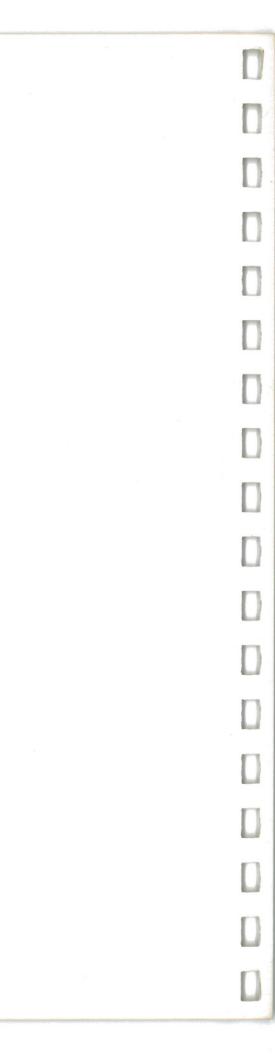
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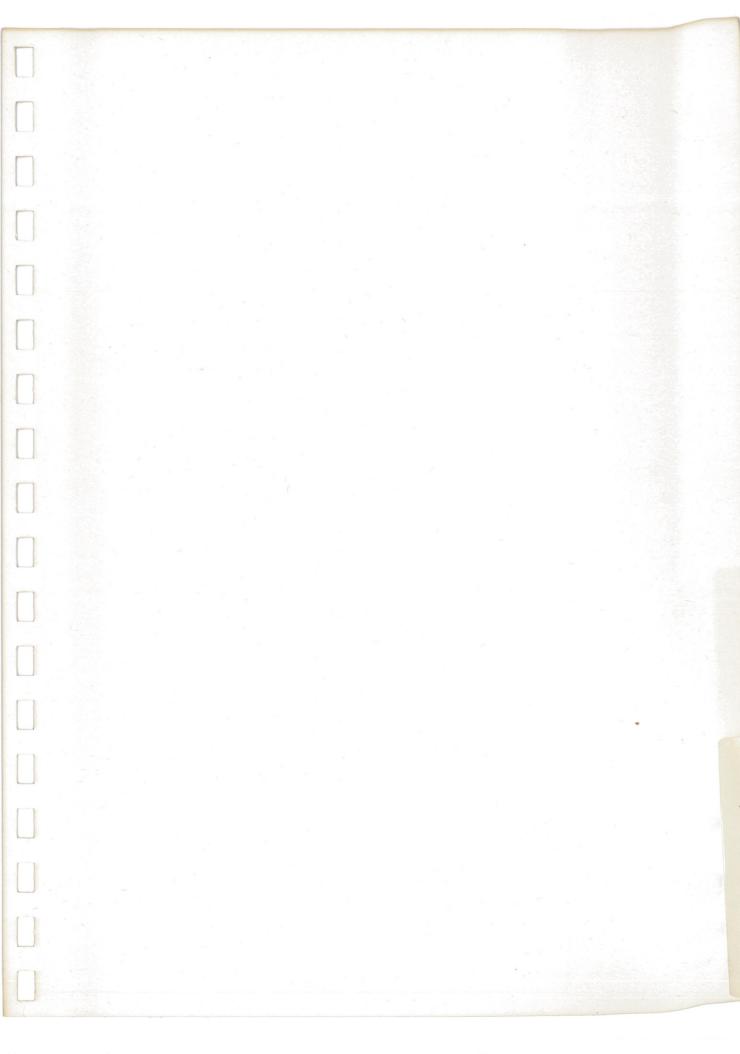
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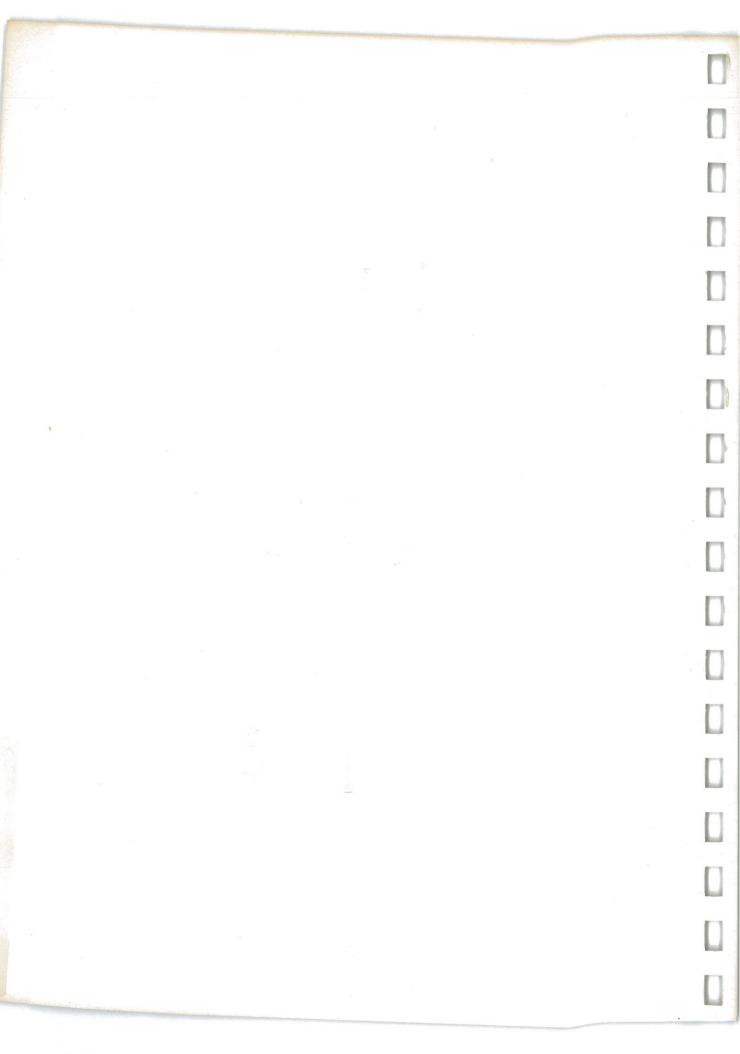


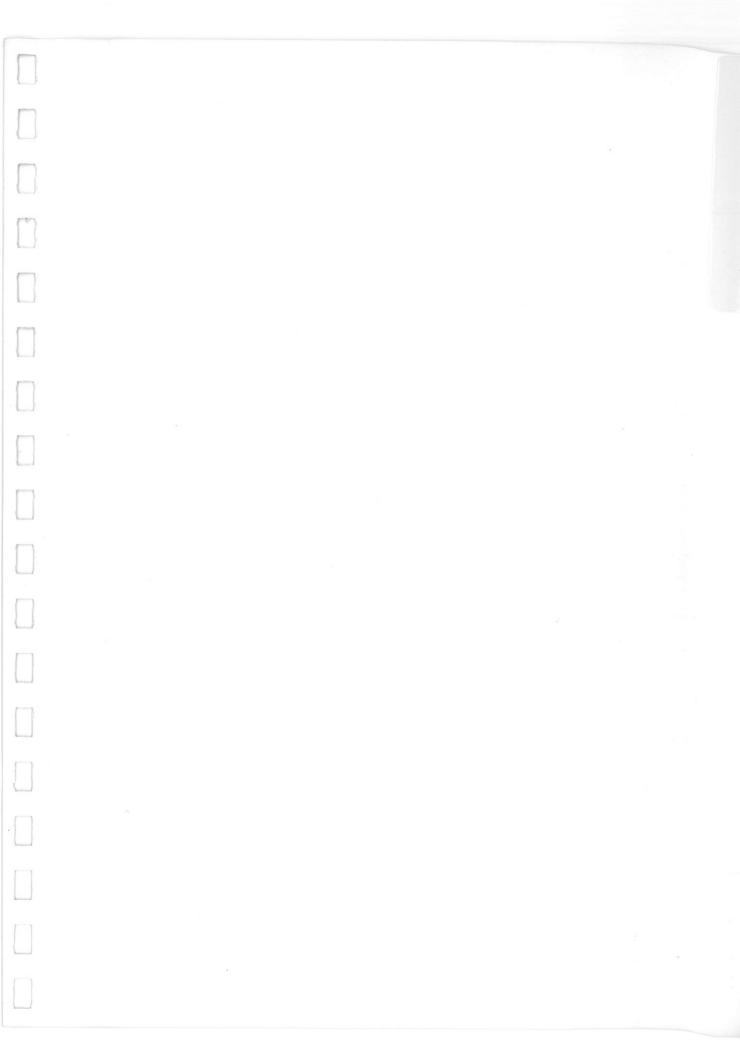




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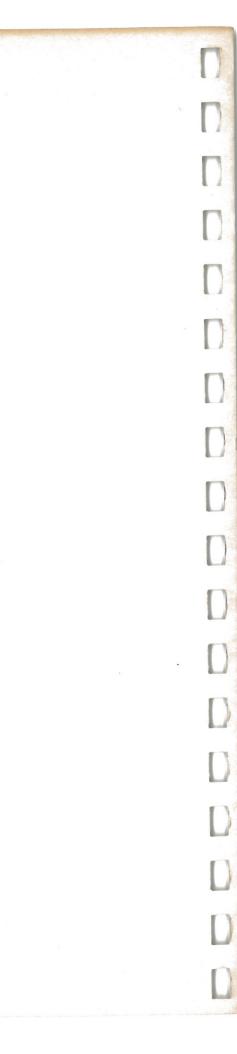












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